Pioneer

Service Manual

ORDER NO.
CRT2593

HIGH POWER CD PLAYER WITH FM/AM TUNER

DEH-1350B

X1M/ES

COMPACT disc DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
DEH-1350/X1M/ES	CRT2559		
CX-958	CRT2423	S8.1	CD Mech. Module:Circuit Description, Mech.Description, Disassembly

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER EUROPE NV Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZA. DEC. 2000 Printed in Japan

EXPLODED VIEWS AND PARTS LIST

PACKING(Page 2)

● **PACKING SECTION PARTS LIST**

* : Non spare part

Mark No.	Symbol and Description	Part No. DEH-1350/X1M/ES	Part No. DEH-1350B/X1M/ES
11-2	Owner's Manual	CRD3281	CRD3407
11-3	Installation Manual	CRD3283	CRD3408
12	Carton	CHG4157	CHG4317
13	Contain Box	CHL4157	CHL4317
16	Case Assy	Not used	CXB3520

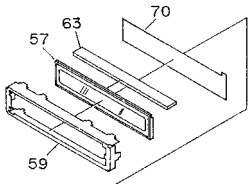
● **Owner's Manual, Installation Manual**

Model	Part No.	Language
DEH-1350B/X1M/ES	CRD3407	English, Spanish, Portuguese(B)
	CRD3408	

EXTERIOR(Page 4)

● **EXTERIOR SECTION PARTS LIST**

Mark No.	Symbol and Description	Part No. DEH-1350/X1M/ES	Part No. DEH-1350B/X1M/ES
45	Detach Grille Assy	CXB6150	CXB7395
56	Keyboard Unit	CWM7307	CWM7795
57	LCD	CAW1633	CAW1688
65	Grille Unit	CXB7186	CXB7288
70	Sheet	Not used	CNM7294



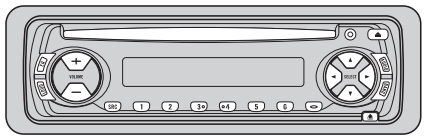
ELECTRICAL PARTS LIST(Page 32)

● **KEYBOARD UNIT**

Symbol and Description	Part No. DEH-1350/X1M/ES	Part No. DEH-1350B/X1M/ES
D 1701 LED	SML210PT	SML210VT
D 1702 LED	SML210PT	SML210VT
D 1703 LED	SML210PT	SML210VT
D 1704 LED	SML210PT	SML210VT
D 1705 LED	SML210PT	SML210VT
D 1706 LED	SML210PT	SML210VT
D 1707 LED	SML210PT	SML210VT
D 1708 LED	SML210PT	SML210VT
IL 1801 Lamp 14V 40mA	CEL1651	CEL1662
IL 1802 Lamp 14V 40mA	CEL1651	CEL1662
LCD	CAW1633	CAW1688
R 1708	RS1/16S151J	RS1/16S181J
R 1710	RS1/16S151J	RS1/16S181J
R 1712	RS1/16S151J	RS1/16S181J

Service Manual

DEH-2350/X1M/ES



ORDER NO.
CRT2559

HIGH POWER CD PLAYER WITH FM/AM TUNER

DEH-2350 X1M/ES

DEH-1350 X1M/ES

COMPACT disc DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

Model No.	Order No.	Mech. Module	Remarks
CX-958	CRT2423	S8.1	CD Mech. Module:Circuit Description, Mech.Description, Disassembly

CONTENTS

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K-ZZA. OCT. 2000 Printed in Japan

● CD Player Service Precautions

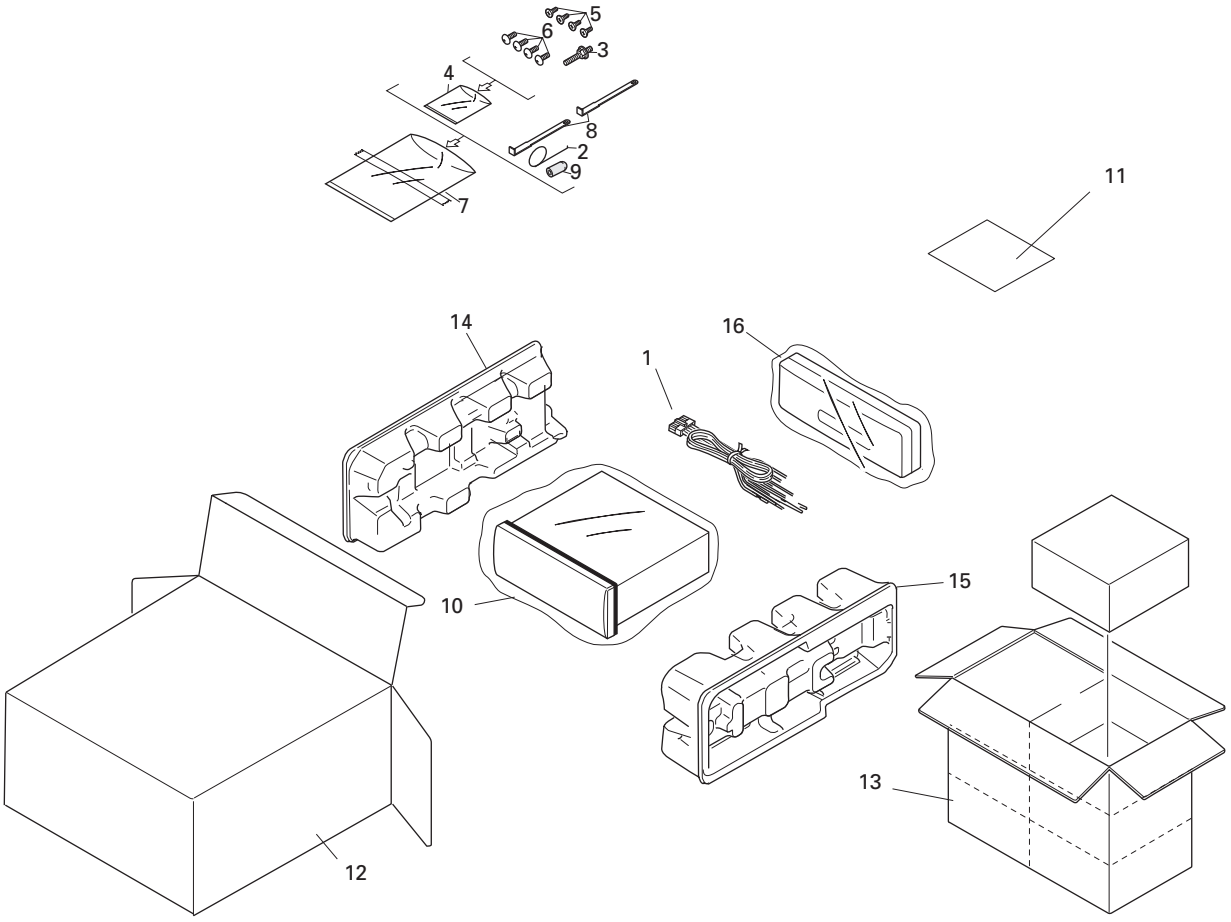
1. For pickup unit(CXX1285) handling, please refer to"Disassembly"(see page 42).
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the service pickup unit(see page 37).

1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty.
If you are not qualified to perform the repair of this product properly and safely; you should not risk trying to do so and refer the repair to a qualified service technician.

2. EXPLODED VIEWS AND PARTS LIST

2.1 PACKING



NOTE:

● Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.

● Screws adjacent to ∇ mark on the product are used for disassembly.

(1) PACKING SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Cord Assy	CDE6468
	2	Spring	CBH1650
	3	Screw	CBA1002
*	4	Polyethylene Bag	CEG-127
	5	Screw	CRZ50P090FMC
	6	Screw	TRZ50P080FMC
*	7	Polyethylene Bag	CEG-158
	8	Handle	CNC5395
	9	Bush	CNV3930
	10	Polyethylene Bag	CEG-162
	11-1	•••••	
	11-2	Owner's Manual	CRD3281
	11-3	Installation Manual	CRD3283
	12	Carton	See Contrast table(2)
	13	Contain Box	See Contrast table(2)
	14	Protector	CHP2346
	15	Protector	CHP2347
	16	Case Assy	See Contrast table(2)

(2) CONTRAST TABLE

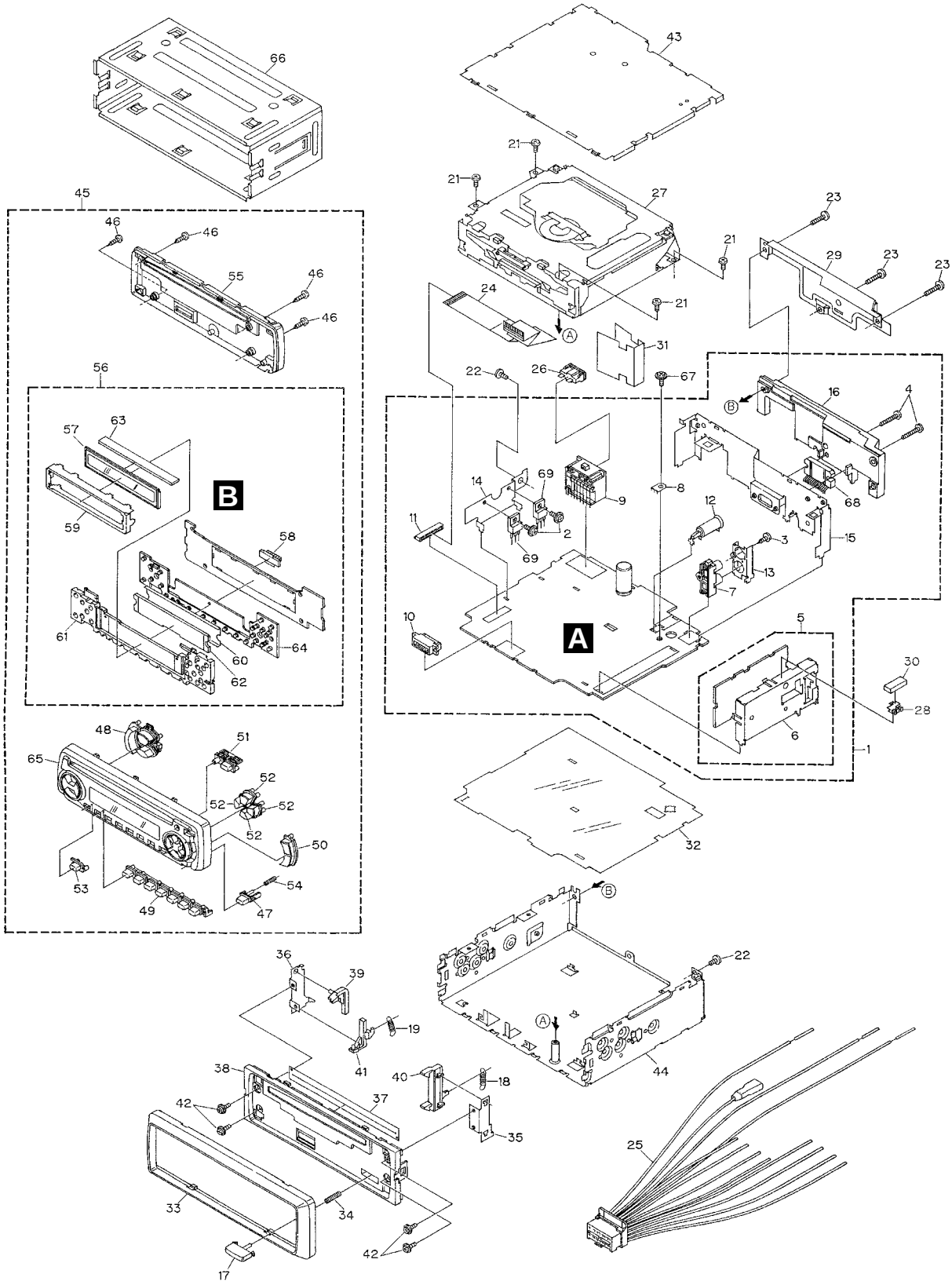
DEH-2350/X1M/ES and DEH-1350/X1M/ES are constructed the same except for the following:

Mark No.	Symbol and Description	Part No.	
		DEH-2350/X1M/ES	DEH-1350/X1M/ES
12	Carton	CHG4150	CHG4157
13	Contain Box	CHL4150	CHL4157
16	Case Assy	CXB3520	Not used

● **Owner's Manual, Installation Manual**

Model	Part No.	Language
DEH-2350/X1M/ES	CRD3281	English, Spanish, Portuguese(B),
DEH-1350/X1M/ES	CRD3283	Chinese, Arabic

2.2 EXTERIOR


66
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30
28
6
1
48
51
65
52
52
52
52
50
53
54
49
47
32
B
36
39
22
19
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A
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17

(1) EXTERIOR SECTION PARTS LIST

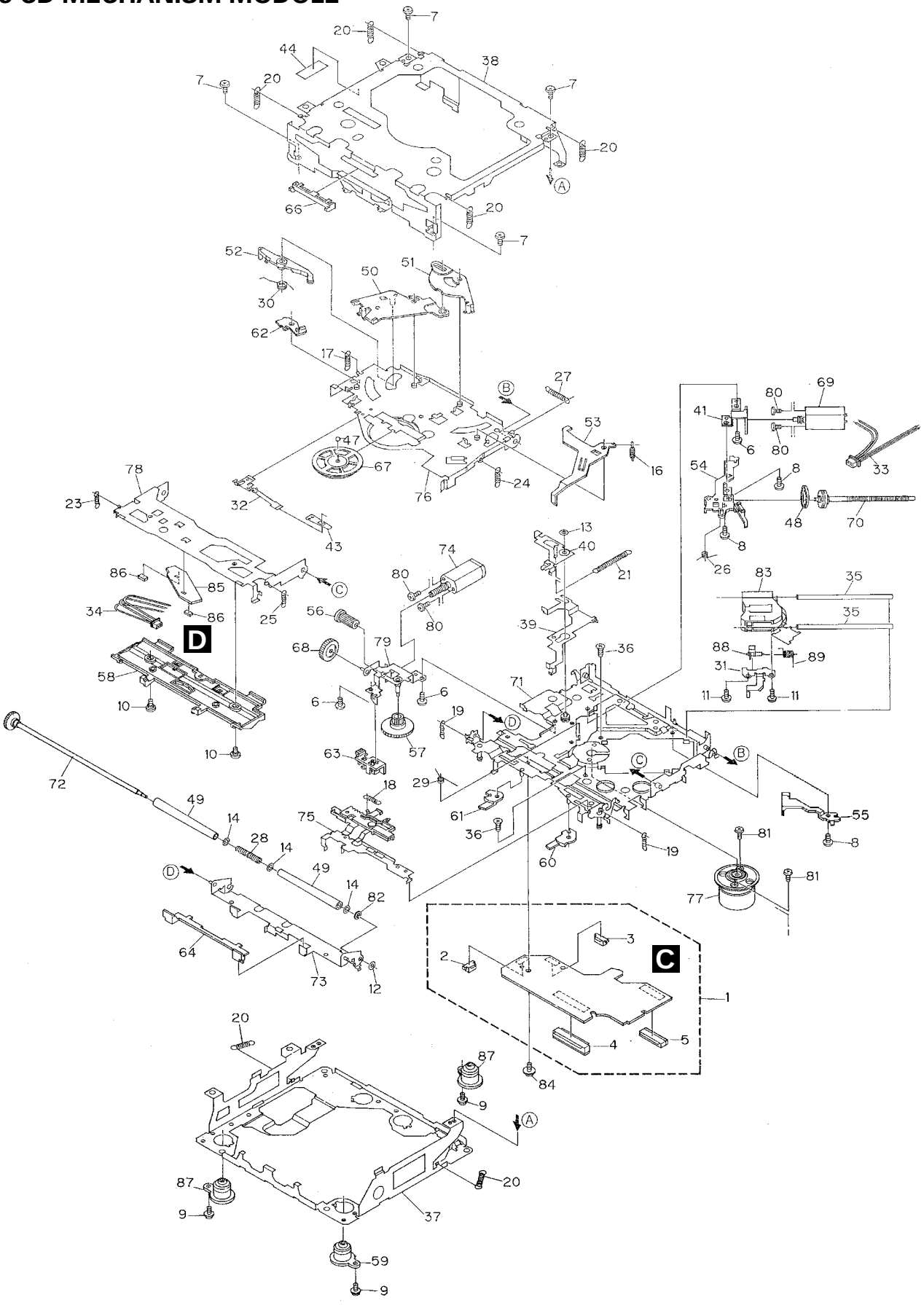
Mark No.	Description	Part No.
1	Tuner Amp Unit	See Contrast table(2)
2	Screw	ASZ26P080FMC
3	Screw	BPZ26P080FMC
4	Screw	BSZ26P160FMC
5	FM/AM Tuner Unit	CWE1563
6	Holder	CNC8815
7	Pin Jack(CN301)	CKB1041
8	Terminal(CN403)	CKF1059
9	Plug(CN901)	CKM1330
10	Connector(CN601)	CKS3581
11	Connector(CN605)	CKS3838
12	Antenna Jack(CN402)	CKX1056
13	Holder	CNC8041
14	Holder	CNC8043
15	Holder	CNC9128
16	Heat Sink	CNR1589
17	Button	CAC4836
18	Spring	CBH1835
19	Spring	CBH2208
20	•••••	
21	Screw	BSZ26P060FMC
22	Screw	BSZ30P060FMC
23	Screw	BSZ30P120FMC
24	Cable	CDE6160
25	Cord Assy	CDE6468
26	Fuse(10A)	CEK1136
27	CD Mechanism Module(S8.1)	CXK5203
28	Holder	CNC5704
29	Cover	CNC9127
30	Cushion	CNM5210
31	Insulator	CNM6224
32	Insulator	CNM6386
33	Panel	CNS6344
34	Spring	CBH2367
35	Bracket	CNC6791
36	Holder	CNC8042
37	Cover	CNM6276
38	Panel	CNS5355
39	Arm	CNV4692
40	Arm	CNV4728
41	Arm	CNV5576
42	Screw	IMS20P030FZK
43	Case Unit	CXB4033
44	Chassis Unit	CXB4625
45	Detach Grille Assy	See Contrast table(2)
46	Screw	BPZ20P100FZK
47	Button(DETACH)	CAC5789
48	Button(+/-, EQ, LD)	CAC6821
49	Button(1-6, CLK)	CAC6822
50	Button(A, B)	CAC6823
51	Button(EJECT/BSM)	CAC6824
52	Button(CROSS)	CAC6825
53	Button(SOURCE)	CAC6851
54	Spring	CBH2210
55	Cover	CNS6114
56	Keyboard Unit	See Contrast table(2)
57	LCD	See Contrast table(2)
58	Connector(CN1801)	CKS3580
59	Holder	CNC9078
60	Sheet	CNM7057
61	Lighting Conductor	CNV6475
62	Lighting Conductor	CNV6476
63	Rubber	CNV6477
64	Rubber	CNV6478
65	Grille Unit	See Contrast table(2)
66	Holder Unit	CXB6681
67	Screw	ISS26P055FUC
68	IC(IC302)	PAL006A
69	Transistor(Q904, 981)	2SD2396

(2) CONTRAST TABLE

DEH-2350/X1M/ES and DEH-1350/X1M/ES are constructed the same except for the following:

Mark No.	Symbol and Description	Part No.	
		DEH-2350/X1M/ES	DEH-1350/X1M/ES
1	Tuner Amp Unit	CWM7293	CWM7297
45	Detach Grille Assy	CXB6146	CXB6150
56	Keyboard Unit	CWM7303	CWM7307
57	LCD	CAW1606	CAW1633
65	Grille Unit	CXB7182	CXB7186

2.3 CD MECHANISM MODULE

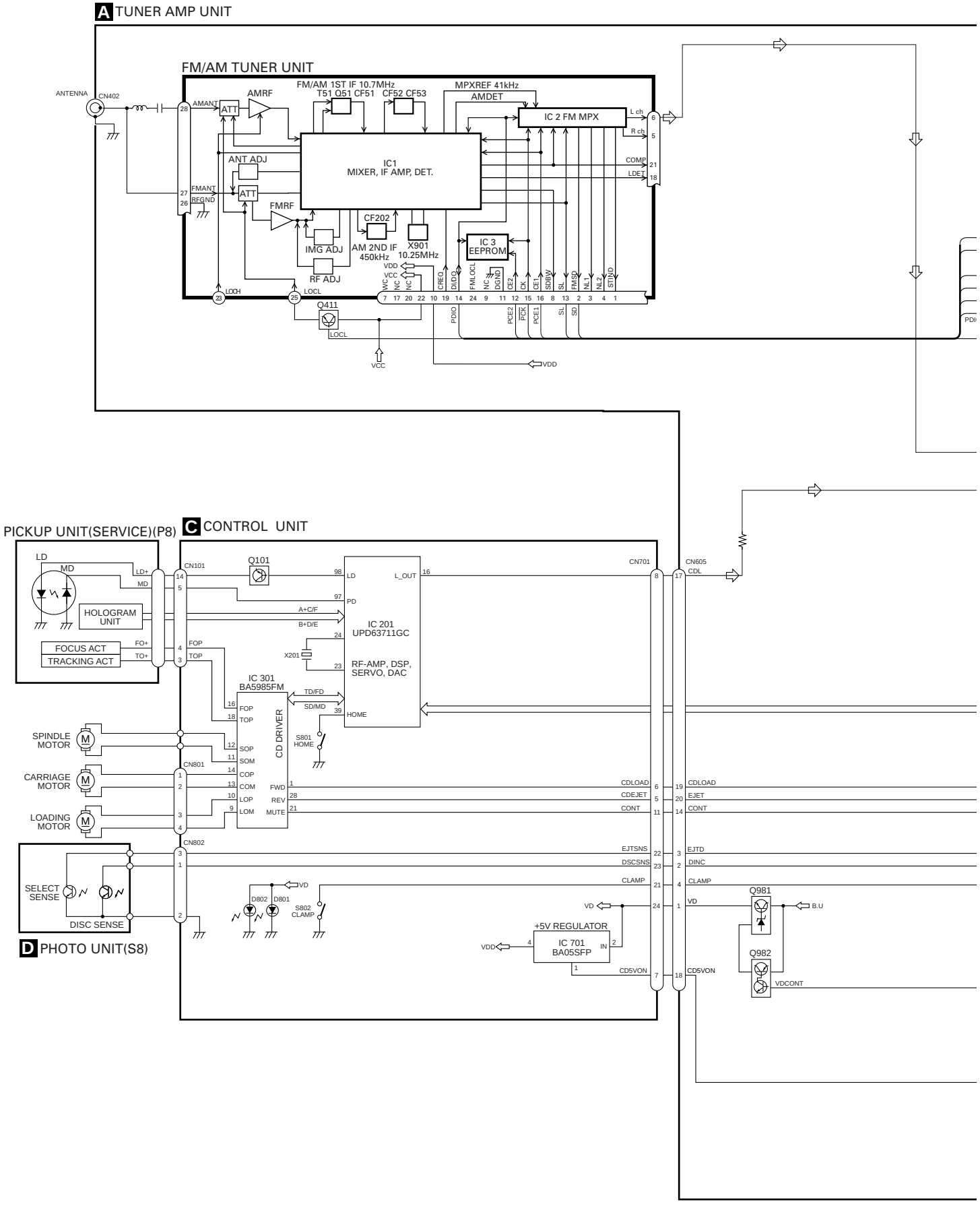


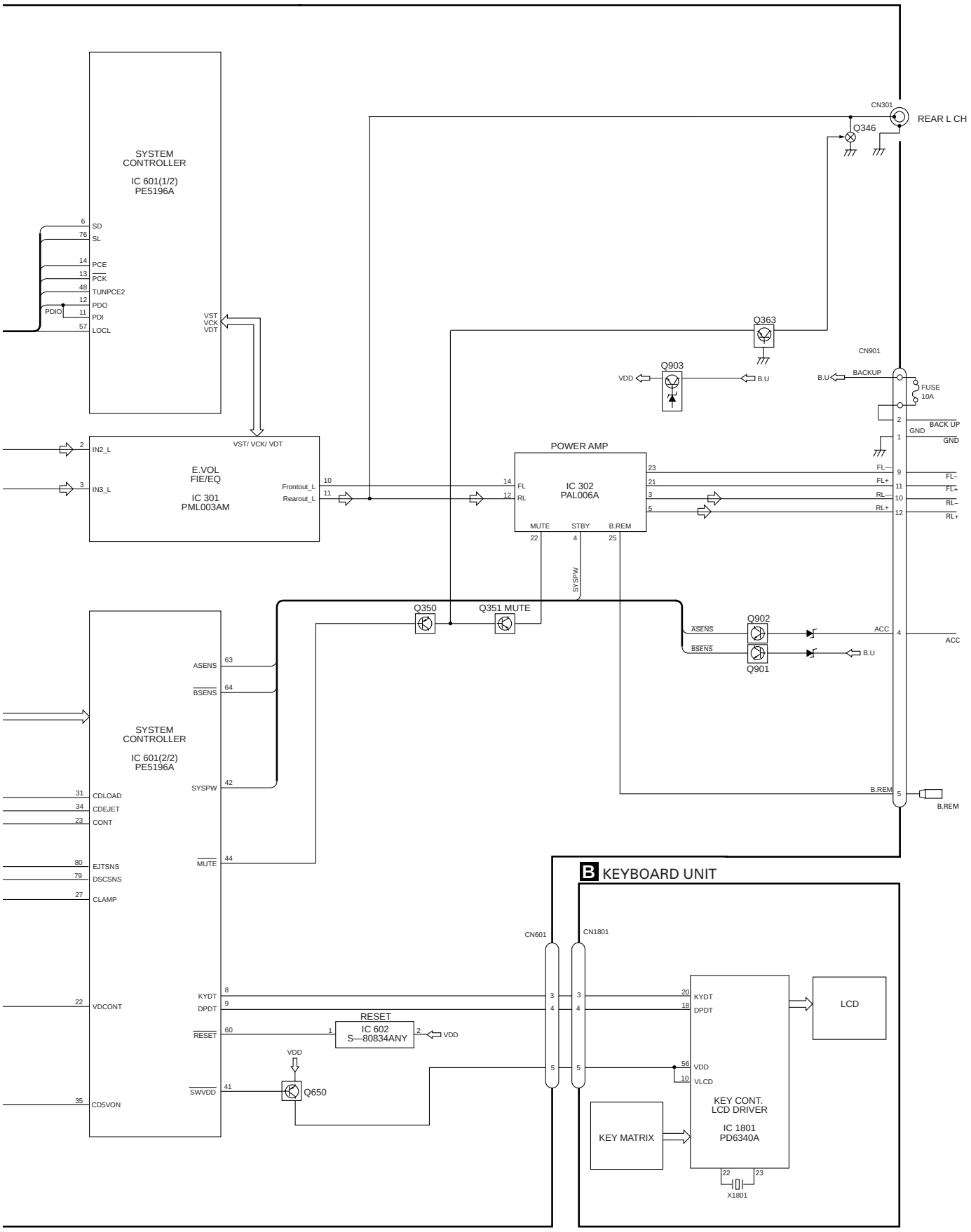
● CD MECHANISM MODULE SECTION PARTS LIST

Mark	No.	Description	Part No.
	1	Control Unit	CWX2411
	2	Connector(CN802)	CKS2192
	3	Connector(CN801)	CKS2193
	4	Connector(CN701)	CKS2773
	5	Connector(CN101)	CKS3486
	6	Screw	BMZ20P030FMC
	7	Screw	BSZ20P040FMC
	8	Screw(M2x3)	CBA1077
	9	Screw(M2x5)	EBA1028
	10	Screw	CBA1243
	11	Screw(M2x4)	CBA1362
	12	Washer	CBF1037
	13	Washer	CBF1038
	14	Washer	CBF1060
	15	•••••	
	16	Spring	CBH2079
	17	Spring	CBH2117
	18	Spring	CBH2314
	19	Spring	CBH2110
	20	Spring	CBH2282
	21	Spring	CBH2318
	22	•••••	
	23	Spring	CBH2324
	24	Spring	CBH2118
	25	Spring	CBH2161
	26	Spring	CBH2163
	27	Spring	CBH2189
	28	Spring	CBH2377
	29	Spring	CBH2260
	30	Spring	CBH2262
	31	Bracket	CNC8568
	32	Spring	CBL1369
	33	Connector	CDE5531
	34	Connector	CDE5532
	35	Shaft	CLA3894
	36	Screw(M2.6x6)	CBA1458
	37	Frame	CNC8565
	38	Frame	CNC8749
	39	Lever	CNC9265
	40	Arm	CNC8663
	41	Bracket	CNC8567
	42	•••••	
	43	Spacer	CNM3315
	44	Sheet	CNM6659
	45	•••••	
	46	•••••	
	47	Ball	CNR1189
	48	Belt	CNT1086
	49	Roller	CNV4509
	50	Arm	CNV6037
	51	Arm	CNV5247
	52	Arm	CNV5248
	53	Arm	CNV5249
	54	Guide	CNV5254
	55	Guide	CNV5255
	56	Gear	CNV5257
	57	Gear	CNV5256
	58	Guide	CNV6272
	59	Damper	CNV6174
	60	Arm	CNV6096
	61	Arm	CNV6031
	62	Arm	CNV6211
	63	Guide	CNV6012
	64	Guide	CNV5510
	65	•••••	
	66	Guide	CNV5751
	67	Clamper	CNV6013
	68	Gear	CNV5813
	69	Motor Unit(M1)	CXB2190
	70	Screw Unit	CXB5892
	71	Chassis Unit	CXB4797
	72	Gear Unit	CXB4728
	73	Arm Unit	CXB5753
	74	Motor Unit(M2)	CXB2195
	75	Lever Unit	CXB4730
	76	Arm Unit	CXB4731
	77	Motor Unit(M3)	CXB2562
	78	Arm Unit	CXB4732
	79	Bracket Unit	CXB4795
	80	Screw	JFZ20P025FMC
	81	Screw	JGZ17P025FZK
	82	Washer	YE20FUC
	83	Pickup Unit(Service)(P8)	CXX1285
	84	Screw	IMS26P030FMC
*	85	PCB	CNX2982
	86	Photo-transistor(Q1, 2)	CPT230SX-TU
	87	Damper	CNV6175
	88	Rack	CNV6014
	89	Spring	CBH2315

3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

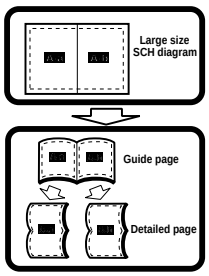
3.1 BLOCK DIAGRAM




SYSTEM CONTROLLER
IC 601(1/2)
PE5196A
SD
SL
PCE
PCK
TUNPCE2
PDO
PDI
LOCL
PDIO
VST
VCK
VDT
VST/ VCK/ VDT
E.VOL
FIE/EQ
IC 301
PML003AM
IN2_L
IN3_L
Frontout_L
Rearout_L
POWER AMP
IC 302
PAL006A
FL
RL
MUTE
STBY
B.REM
SYSPW
CN301
REAR L CH
Q346
Q363
Q903
VDD
B.U
CN901
BACKUP
FUSE
10A
BACK UP
GND
FL—
FL+
RL—
RL+
Q350
Q351 MUTE
ASENS
BSENS
Q902
Q901
ACC
SYSTEM CONTROLLER
IC 601(2/2)
PE5196A
CDLOAD
CDEJET
CONT
EJTSNS
DSCSNS
CLAMP
VDCONT
CD5VON
KYDT
DPDT
RESET
SWVDD
IC 602
S—80834ANY
Q650
B KEYBOARD UNIT
CN601
CN1801
KEY MATRIX
KEY CONT.
LCD DRIVER
IC 1801
PD6340A
VLCD
LCD
X1801

3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".



A TUNER AMP UNIT

A-a

FM/AM TUNER UNIT

FM(100%):-19.5dBs
AM(30%):-30dBs

CN402

CN403

Q411 2SC2412K

IC601 PE5196A SYSTEM CONTROLLER

CSS1025 4.194304MHz

B KEYBOARD UNIT

CN601

2SA1837K Q650

RN1610

RN46A1

NOTE :

- Symbol indicates a resistor. No differentiation is made between chip resistors and discrete resistors.
- Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

For resistors and capacitors in the circuit diagrams, their resistance values or capacitance values are expressed in codes:

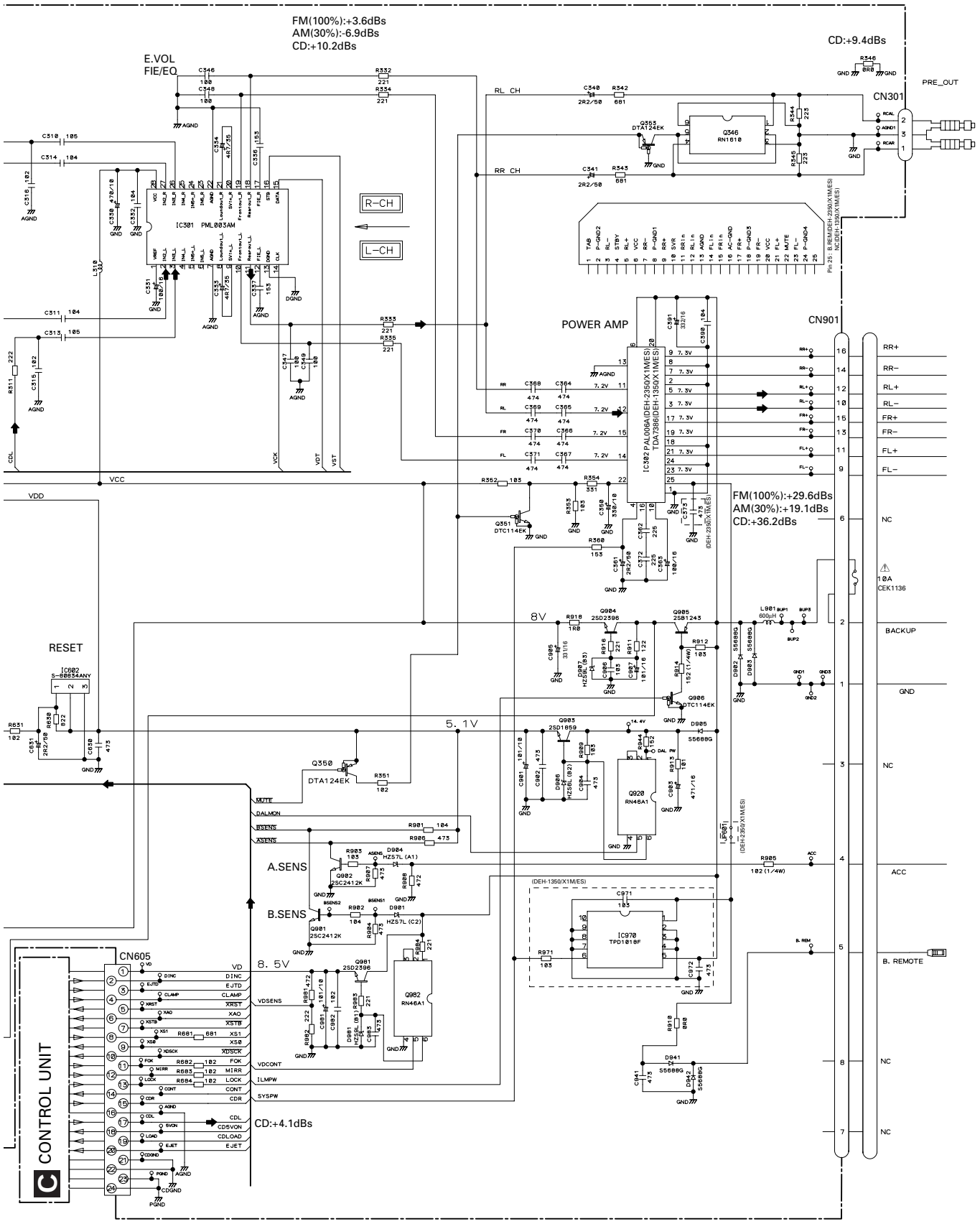
Ex. *Resistors

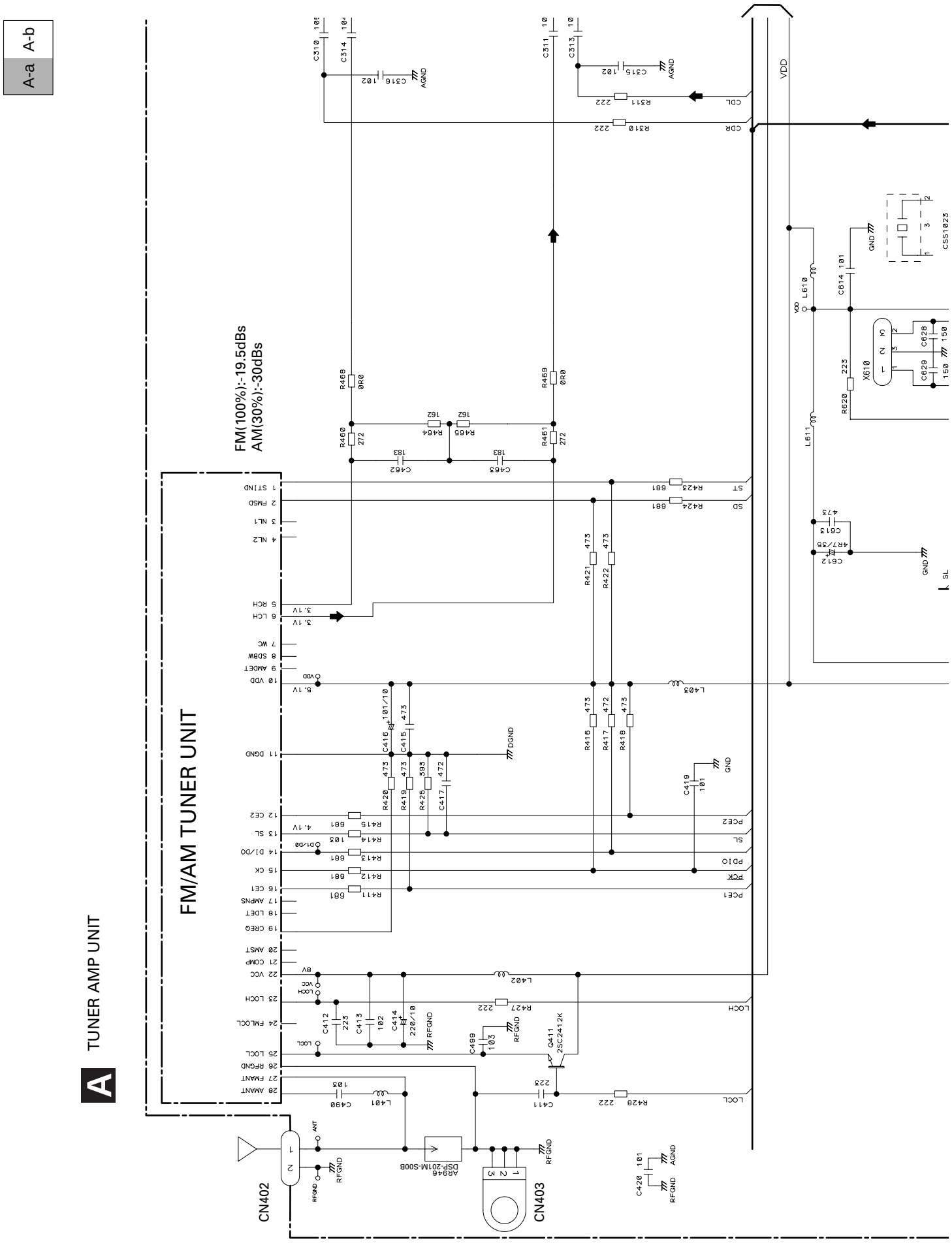
Code	Practical value
123	12k ohms
103	10k ohms

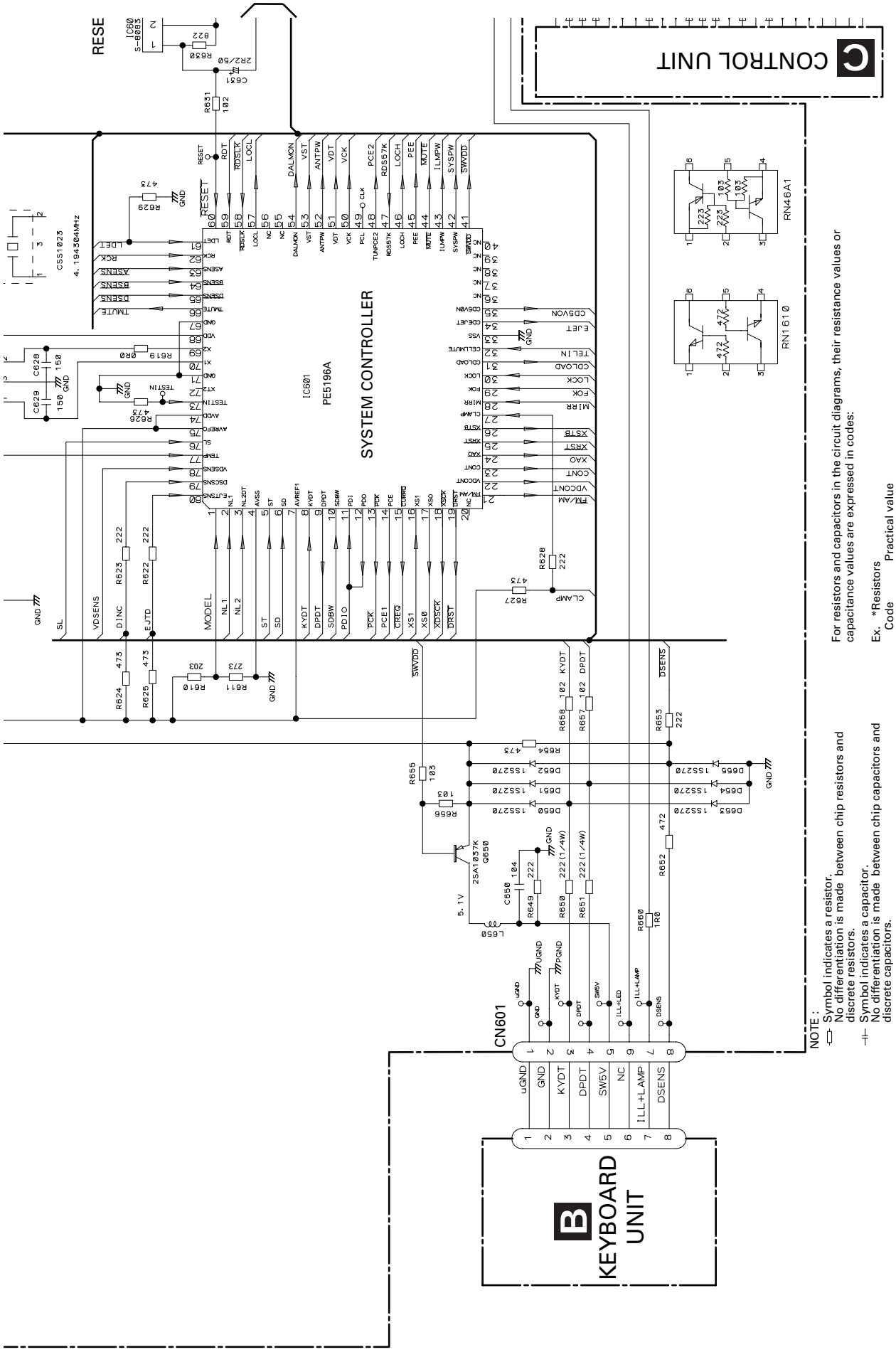
*Capacitors

Code	Practical value
103	0.01µF
101/10	100µF/10V

A-b


FM(100%):+3.6dBs
AM(30%):-6.9dBs
CD:+10.2dBs
CD:+9.4dBs
E.VOL
FIE/EQ
PRE_OUT
CN301
RCAL
AGND1
RCAR
RL CH
RR CH
R-CH
L-CH
IC301 PML003AM
POWER AMP
CN901
IC302 PAL008A(DEH-2350/X1M/ES)
TDA7386(DEH-1350/X1M/ES)
FM(100%):+29.6dBs
AM(30%):+19.1dBs
CD:+36.2dBs
RR+
RR−
RL+
RL−
FR+
FR−
FL+
FL−
NC
10A
CEK1136
BACKUP
GND
ACC
B. REMOTE
VCC
VDD
8V
5.1V
8.5V
RESET
IC602
S-80854ANY
Q350
DTA124EK
MUTE
DALMON
BSENS
ASENS
A.SENS
B.SENS
VDSENS
VDCONT
ILMPW
SYSPW
CN605
CONTROL UNIT
CD:+4.1dBs
CDL
CDSVON
CDLOAD
EJET
FOK
MIRR
LOCK
CONT
CDR
XRST
XAO
XSTB
XS1
XS0
XDSCK
VD
DINC
EJTD
CLAMP
IC970
TPD1018F
(DEH-1350/X1M/ES)
(DEH-2350/X1M/ES)


A-b
A-a
TUNER AMP UNIT
A
FM/AM TUNER UNIT
FM(100%):-19.5dBs
AM(30%):-30dBs
CN402
CN403
DSP-201M-S00B
VDD
DGND
RFGND
AGND
GND
SL
PCE2
PDIO
PCK
PCE1
LOCH
LOCL
CDL
CDR
ST
SD
1 STIND
2 FMSD
3 NL1
4 NL2
5 RCH
6 LCH
7 MC
8 SDBW
9 AMDET
10 VDD
11 DGND
12 CE2
13 SL
14 DI/D0
15 CK
16 CE1
17 AMPNS
18 LDET
19 CREG
20 AMST
21 COMP
22 VCC
23 LOCH
24 FMLOCL
25 LOCL
26 RFGND
27 FMANT
28 AMANT
Q411 2SC2412K
X610
CSS1023



NOTE :
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- ⊣⊢ Symbol indicates a capacitor. No differentiation is made between chip capacitors and discrete capacitors.

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*Capacitors

Code	Practical value
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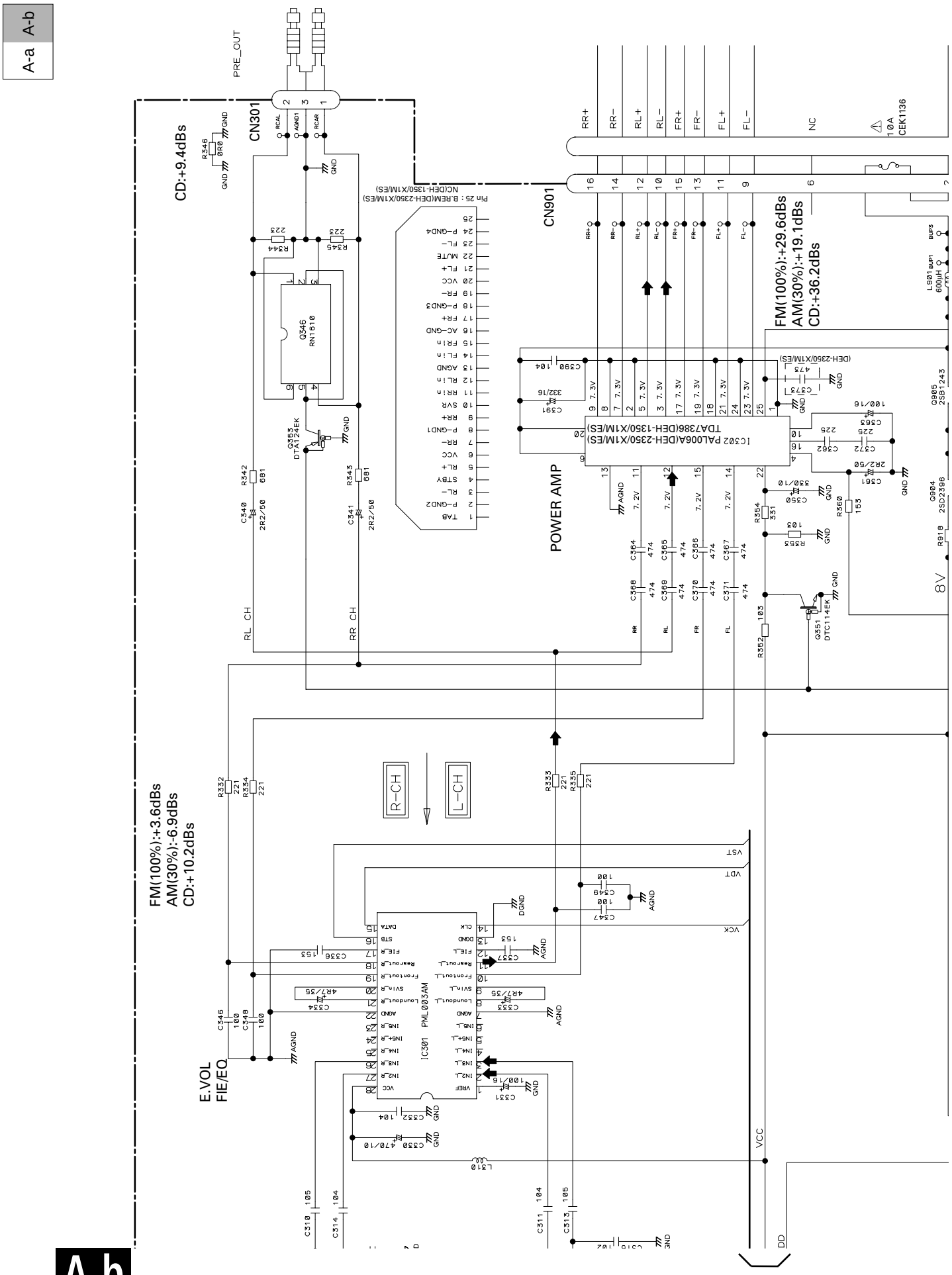
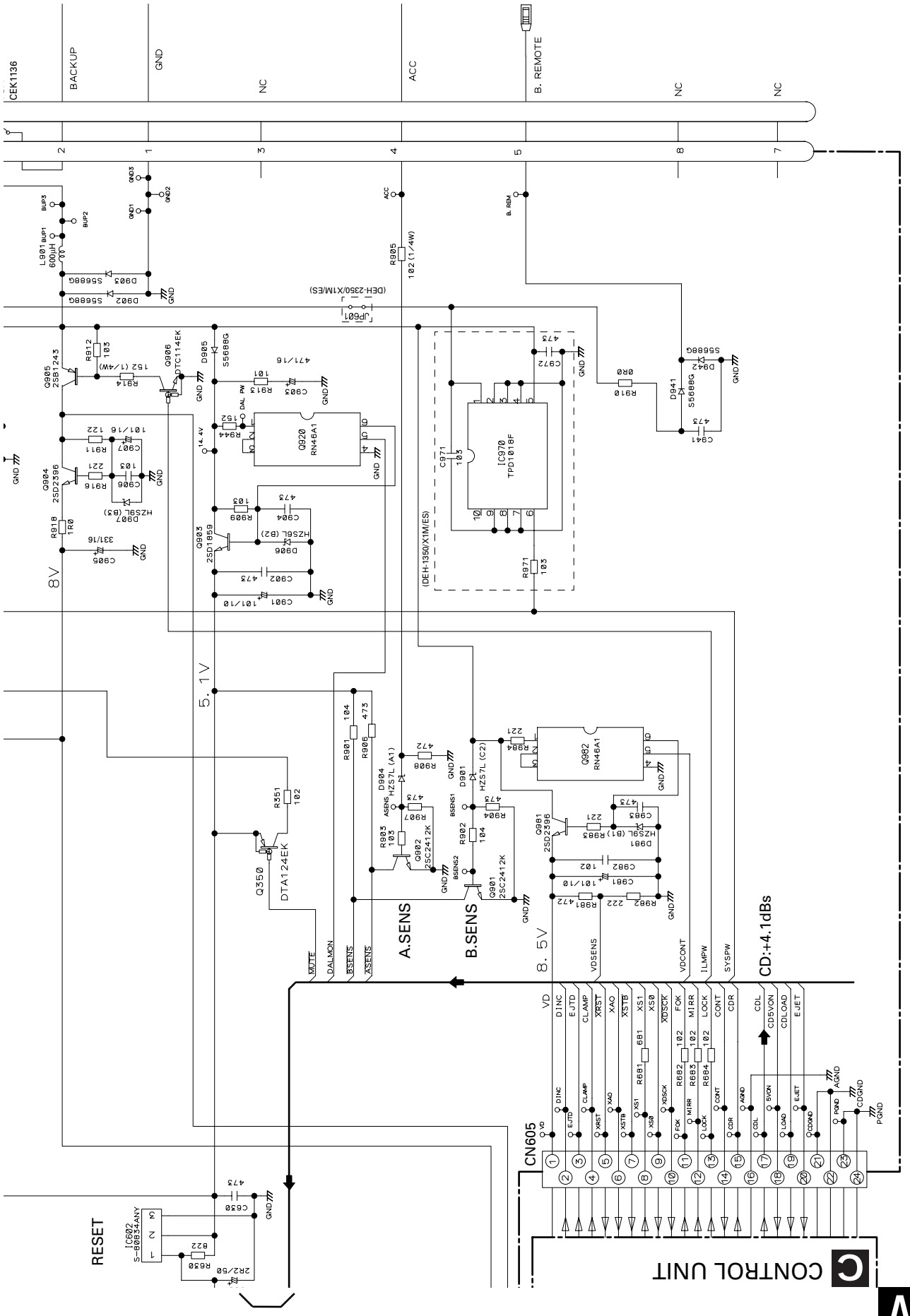
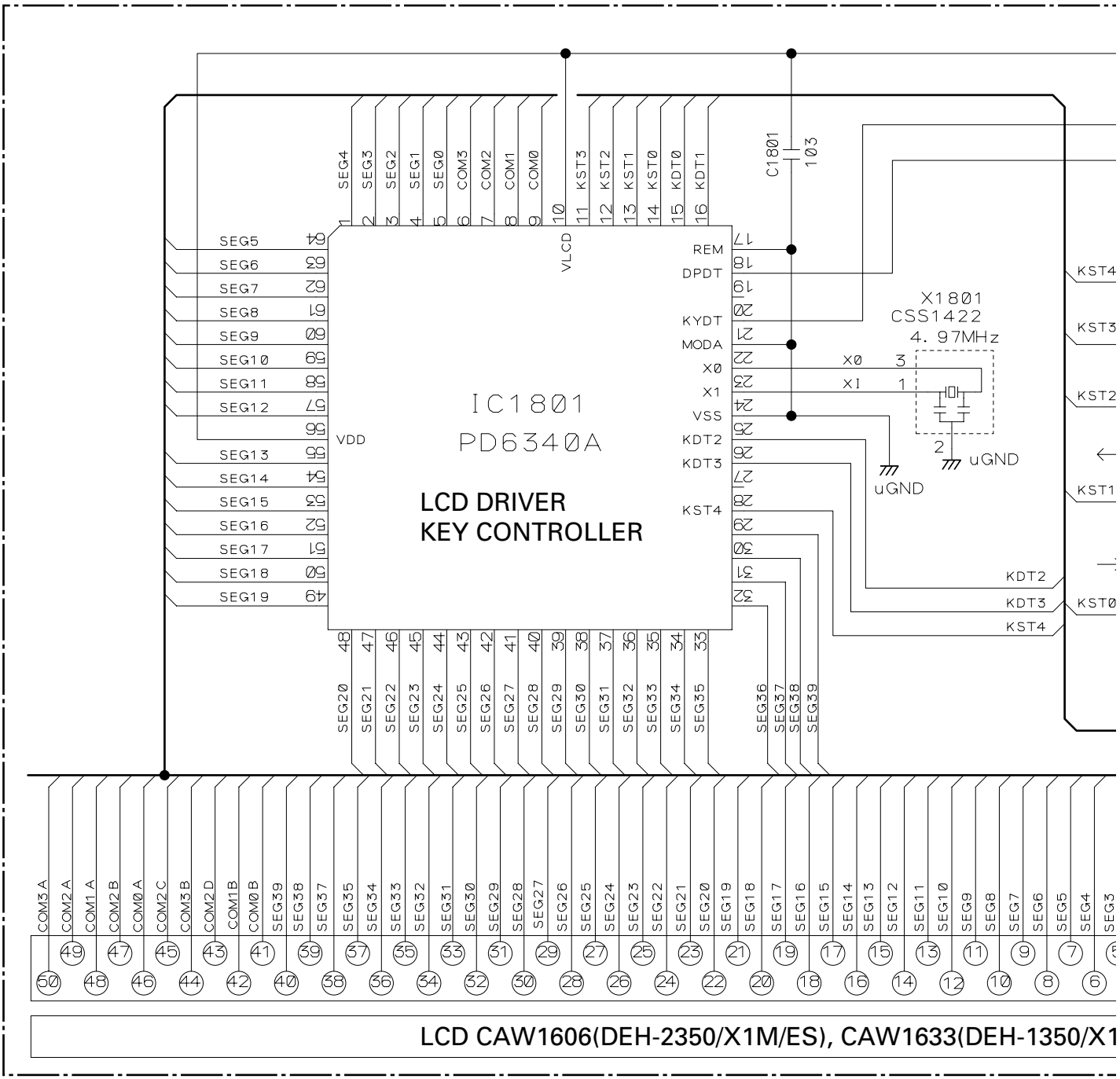
101/10	100µF/10V

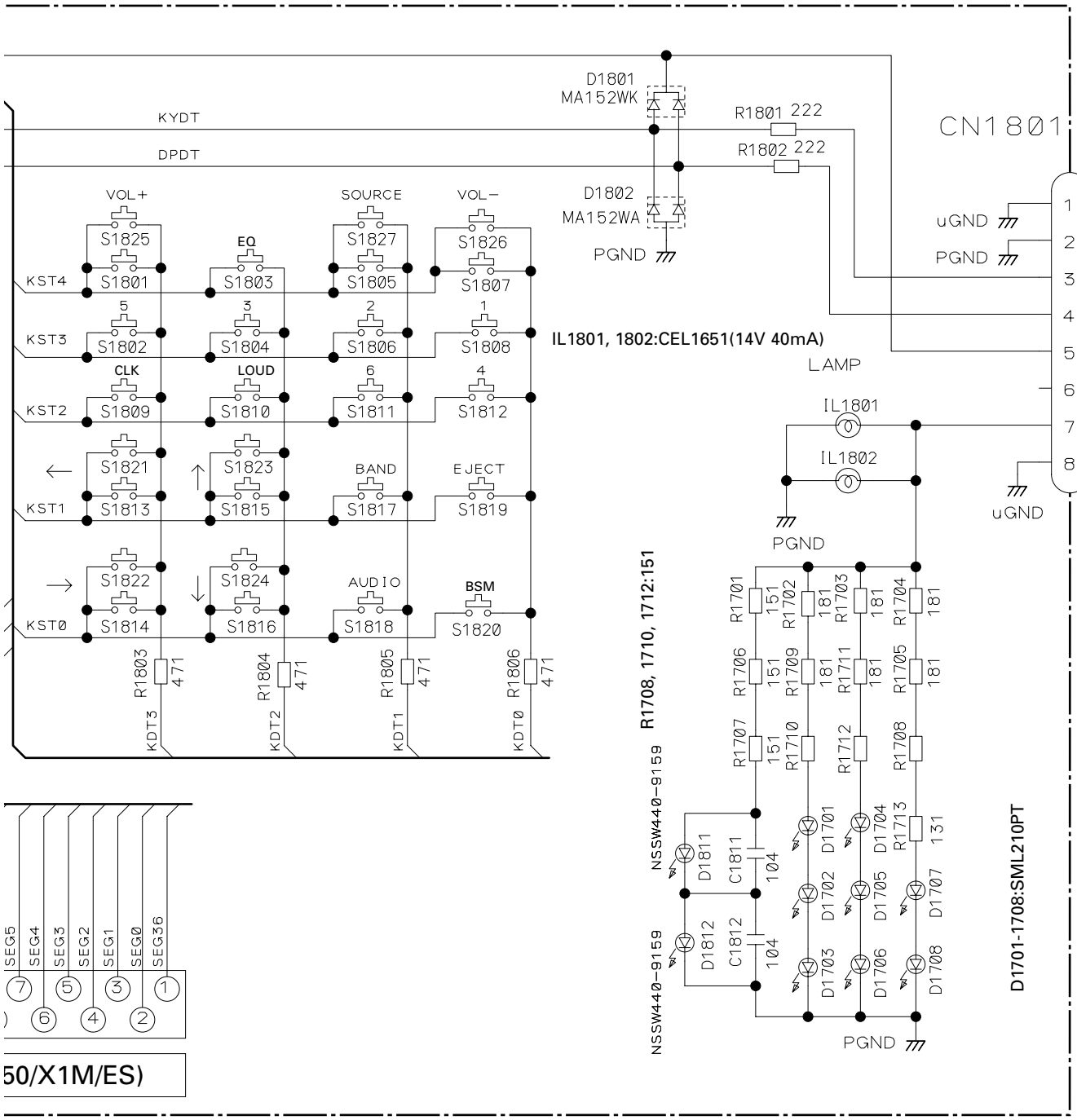

A-a A-b
PRE_OUT
CN301
CD:+9.4dBs
CN901
FM(100%):+29.6dBs
AM(30%):+19.1dBs
CD:+36.2dBs
POWER AMP
FM(100%):+3.6dBs
AM(30%):-6.9dBs
CD:+10.2dBs
E.VOL
FIE/EQ
R-CH
L-CH
RL CH
RR CH
IC301 PML003AM
IC302 PAL006A(DEH-2350/X1M/ES)
TDA7386(DEH-1350/X1M/ES)
NC(DEH-1350/X1M/ES)
Pin 25 : B.REM(DEH-2350/X1M/ES)
RR+
RR−
RL+
RL−
FR+
FR−
FL+
FL−
NC
10A
CEK1136
VCC
8V


CEK1136
BACKUP
GND
NC
ACC
B. REMOTE
NC
NC
8V
5.1V
8.5V
A.SENS
B.SENS
CD:+4.1dBs
CONTROL UNIT
RESET
CN605
(DEH-2350/X1M/ES)
(DEH-1350/X1M/ES)

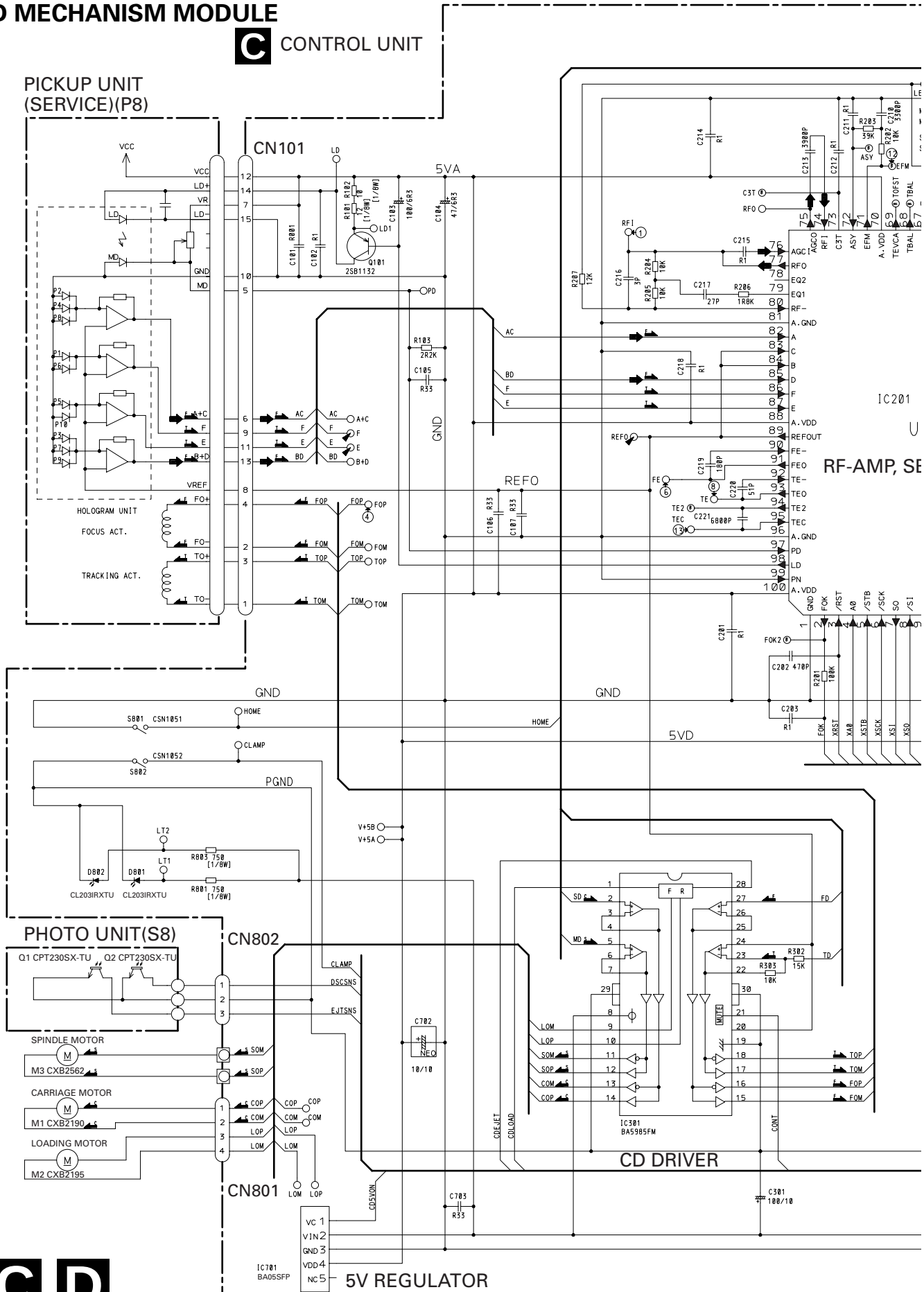
3.3 KEYBOARD UNIT

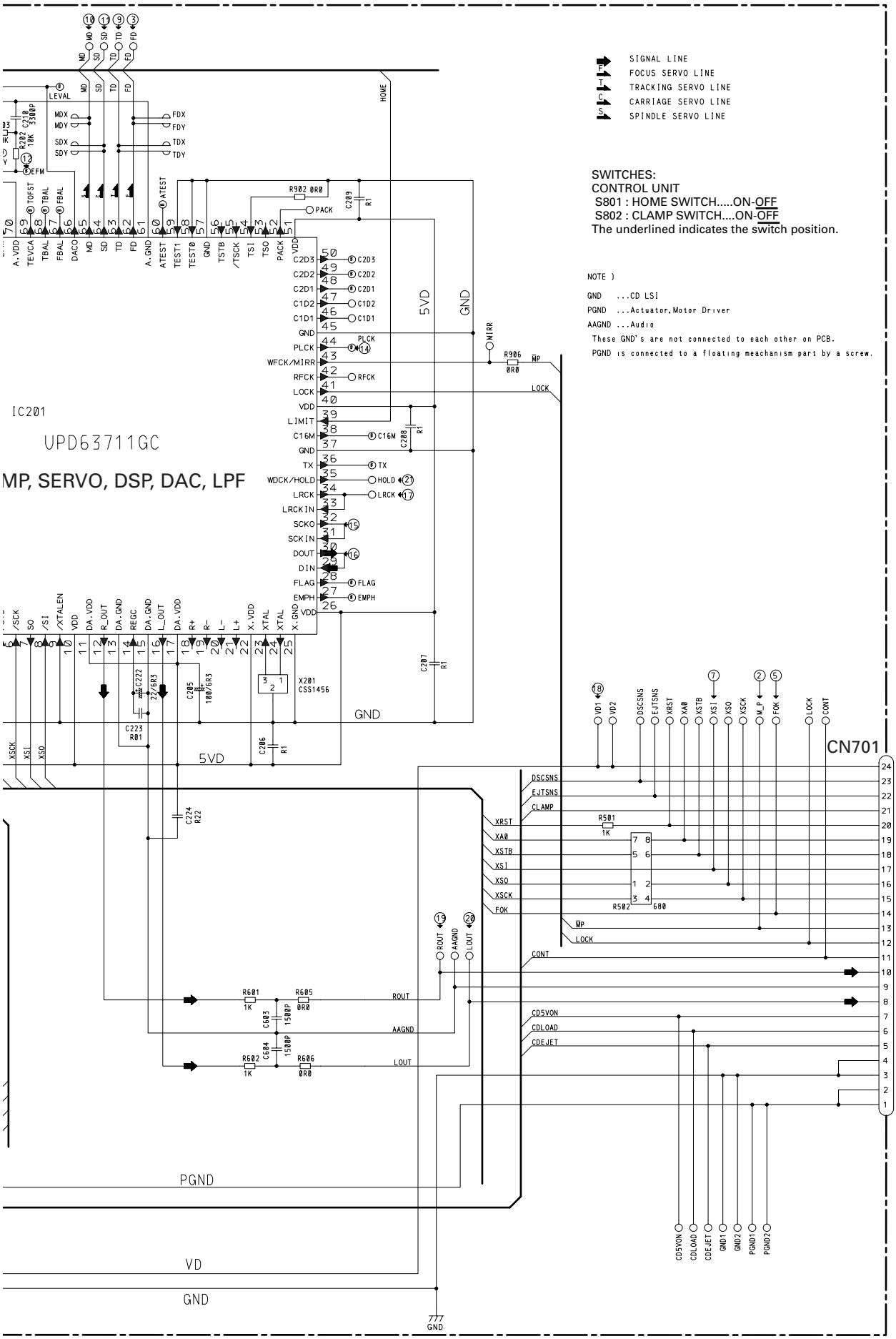
B KEYBOARD UNIT




D1801
MA152WK
R1801 222
R1802 222
KYDT
DPDT
D1802
MA152WA
PGND
CN1801
uGND
PGND
1 uGND
2 GND
3 KYDT
4 DPDT
5 SW5V
6 NC
7 ILL
8 DSENS
A CN601
VOL+
SOURCE
VOL−
EQ
CLK
LOUD
BAND
EJECT
AUDIO
BSM
S1825
S1826
S1827
S1801
S1803
S1805
S1807
S1802
S1804
S1806
S1808
S1809
S1810
S1811
S1812
S1821
S1823
S1813
S1815
S1817
S1819
S1822
S1824
S1814
S1816
S1818
S1820
KST4
KST3
KST2
KST1
KST0
R1803 471
R1804 471
R1805 471
R1806 471
KDT3
KDT2
KDT1
KDT0
IL1801, 1802:CEL1651(14V 40mA)
LAMP
IL1801
IL1802
uGND
PGND
R1708, 1710, 1712:151
R1701 151
R1702 181
R1703 181
R1704 181
R1706 151
R1709 181
R1711 181
R1705 181
R1707 151
R1710 151
R1712
R1708
NSSW440-9159
NSSW440-9159
D1811
C1811 104
D1812
C1812 104
D1701
D1702
D1703
D1704
D1705
D1706
R1713 131
D1707
D1708
D1701-1708:SML210PT
PGND
SEG5
SEG4
SEG3
SEG2
SEG1
SEG0
SEG36
50/X1M/ES)

3.4 CD MECHANISM MODULE

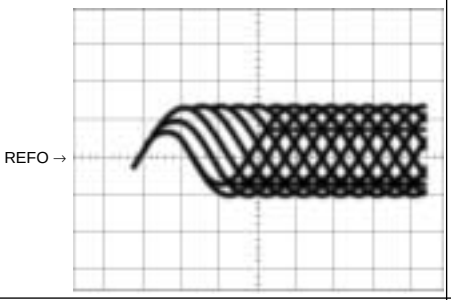



SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
SWITCHES:
CONTROL UNIT
S801 : HOME SWITCH.....ON-OFF
S802 : CLAMP SWITCH....ON-OFF
The underlined indicates the switch position.
NOTE)
GND ...CD LSI
PGND ...Actuator, Motor Driver
AAGND ...Audio
These GND's are not connected to each other on PCB.
PGND is connected to a floating meachanism part by a screw.
IC201
UPD63711GC
MP, SERVO, DSP, DAC, LPF
CN701
CN605
5VD
GND
PGND
VD

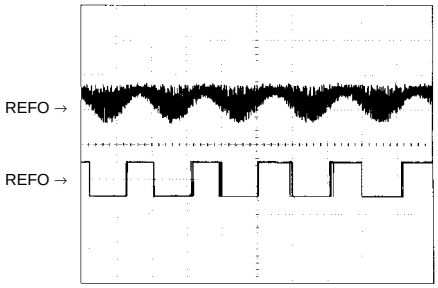
Note:1. The encircled numbers denote measuring pointes in the circuit diagram.
2. Reference voltage
REFO:2.5V

● Waveforms

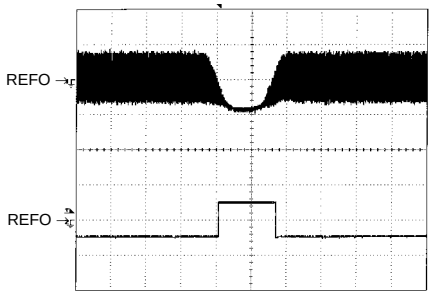
① RFI 0.5V/div. 0.5µs/div.
Normal mode: play



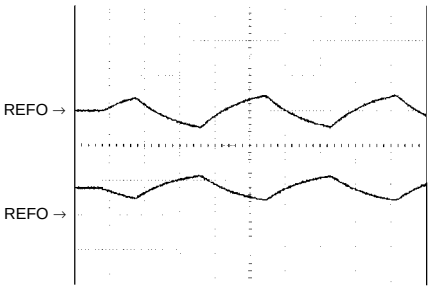
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Test mode: Tracking open



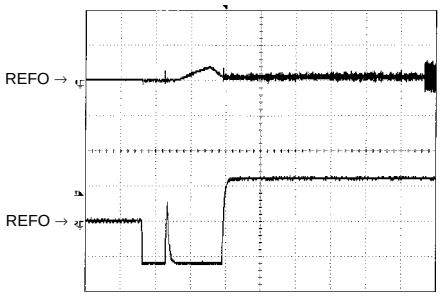
① CH1: RFI 1V/div. 0.5ms/div.
② CH2: MIRR 5V/div.
Normal mode: The defect part passes 800µm



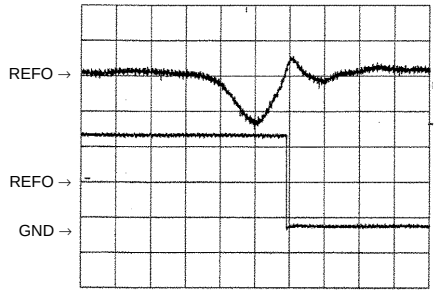
③ CH1: FD 0.5V/div. 0.2s/div.
④ CH2: FO+ 2V/div.
Test mode: No disc, Focus close



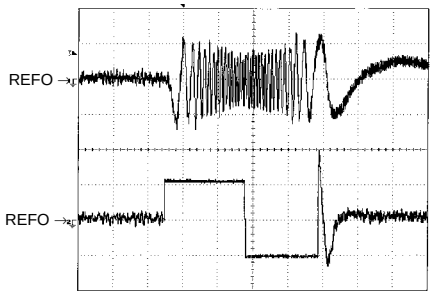
③ CH1: FD 0.5V/div. 0.2s/div.
⑤ CH2: FOK 2V/div.
Normal mode: Focus close



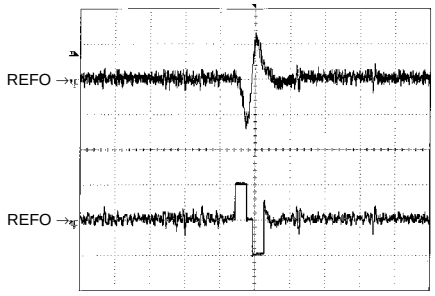
⑥ CH1: FE 0.5V/div. 1ms/div.
⑦ CH2: XSI 2V/div.
Normal mode: Focus close



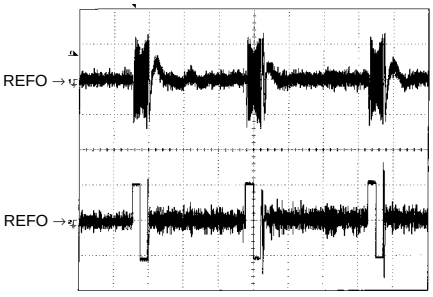
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 32 tracks jump (FWD)



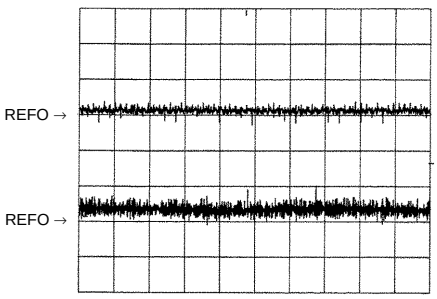
⑧ CH1: TE 0.5V/div. 0.5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: Single jump (FWD)



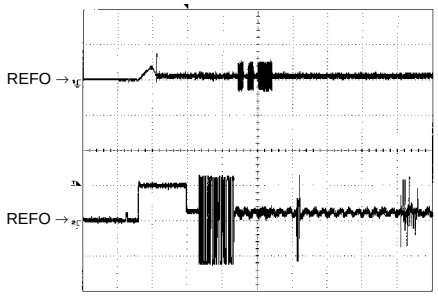
⑧ CH1: TE 0.5V/div. 5ms/div.
⑨ CH2: TD 0.5V/div.
Test mode: 100 tracks jump (FWD)



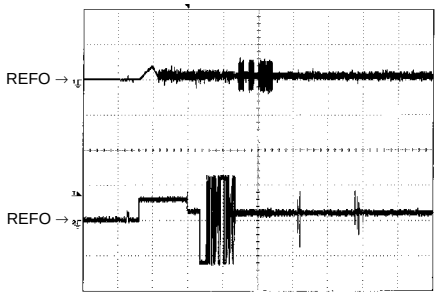
⑥ CH1: FE 0.1V/div. 20ms/div.
③ CH2: FD 0.2V/div.
Normal mode: Play



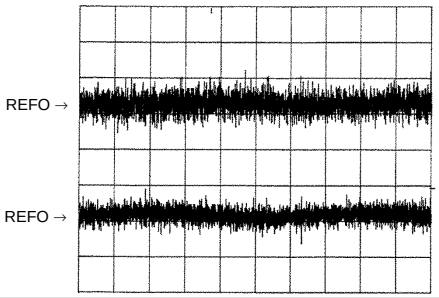
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (12cm)



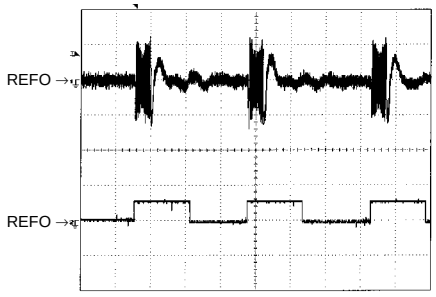
③ CH1: FD 0.5V/div. 0.5s/div.
⑩ CH2: MD 1V/div.
Normal mode: Focus close (8cm)



⑧ CH1: TE 0.2V/div. 20ms/div.
⑨ CH2: TD 0.2V/div.
Normal mode: play

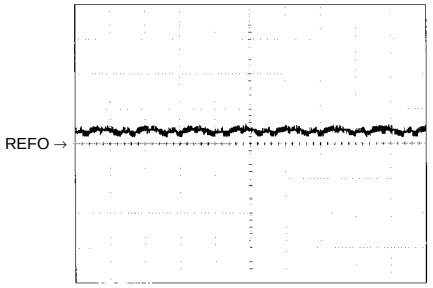


⑧ CH1: TE 0.5V/div. 5ms/div.
⑪ CH2: SD 0.5V/div.
TEST mode: 100 Tracks jump(FWD)

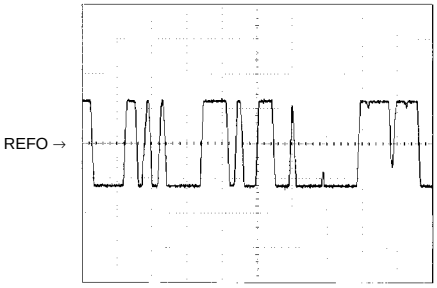


⑩ MD 0.5V/div. 0.1s/div.

Normal mode: Play (12cm)

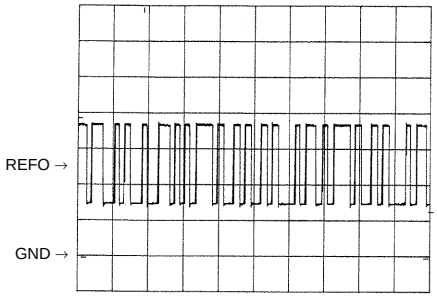


⑩ MD 1V/div. 10ms/div.
Normal mode:
Long Search (12cm)

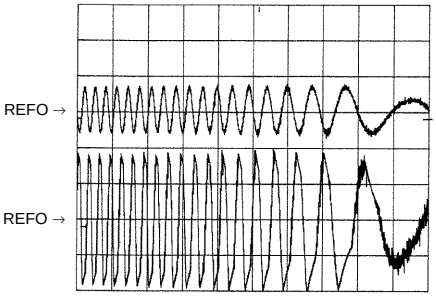


⑫ EFM 1V/div. 5µs/div.

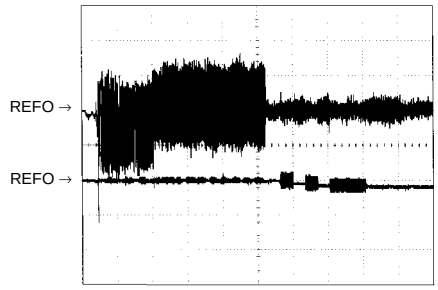
Normal mode: play



⑧ CH1: TE 1V/div. 2ms/div.
⑬ CH2: TEC 1V/div.
Test mode: Focus close
Tracking open

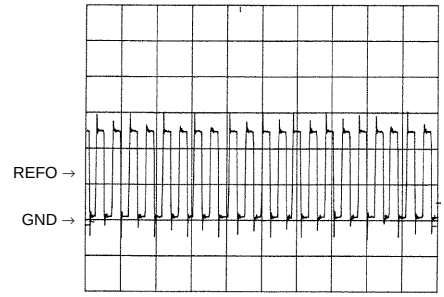


⑧ CH1: TE 0.5V/div. 0.2s/div.
⑥ CH2: FE 0.5V/div.
Normal mode: AGC after focus close



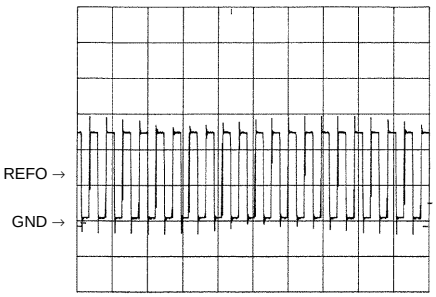
⑭ PLCK 2V/div. 0.5µs/div.

Normal mode: play



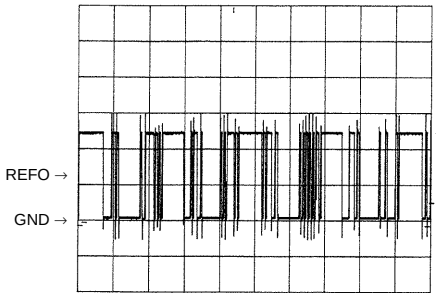
⑮ SCKO 2V/div. 1µs/div.

Normal mode: play



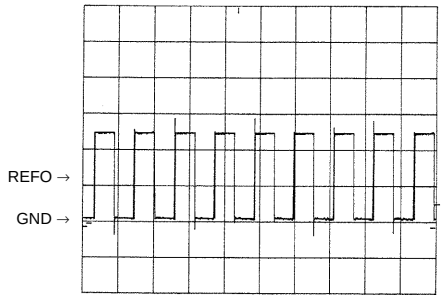
⑯ Dout 2V/div. 10µs/div.

Normal mode: play



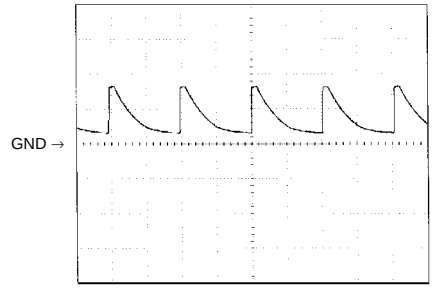
⑰ LRCK 2V/div. 20µs/div.

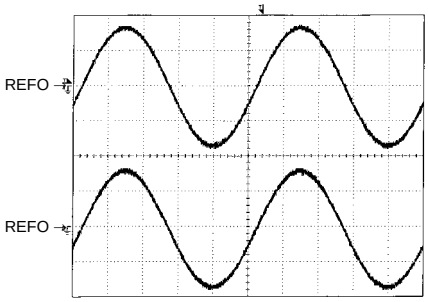
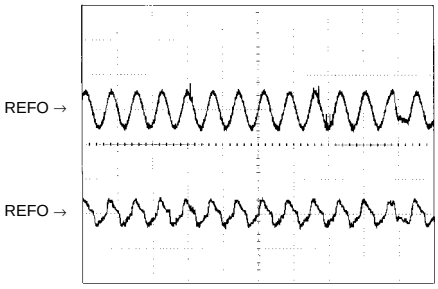
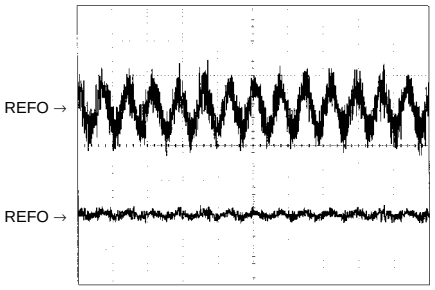
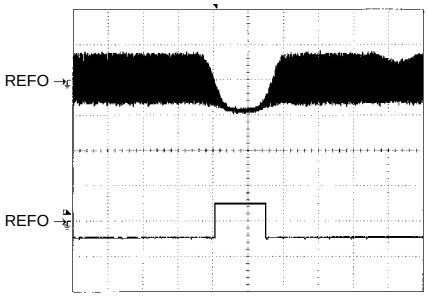
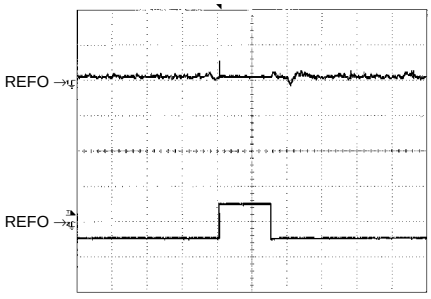
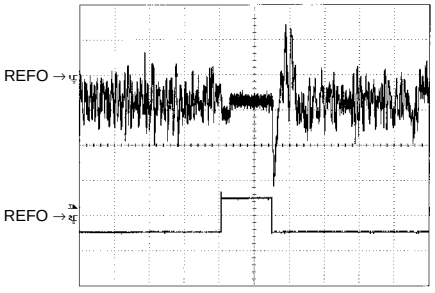
Normal mode: play



⑱ VD 5V/div. 50ms/div.

Normal mode: No disc



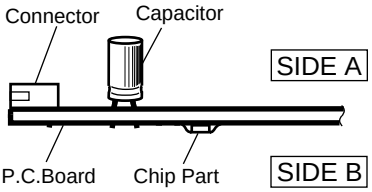
⑲ CH1: R OUT 1V/div. ⑳ CH2: L OUT 1V/div. 0.2ms/div. Normal mode: Play (1kHz 0dB) 	⑥ CH1: FE 0.2V/div. ③ CH2: FD 0.5V/div. 1ms/div. Normal mode: During AGC 	⑧ CH1: TE 0.2V/div. ⑨ CH2: TD 0.5V/div. 1ms/div. Normal mode: During AGC 
① CH1: RFI 1V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 	③ CH1: FD 0.5V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 	⑨ CH1: TD 0.1V/div. ㉑ CH2: HOLD 5V/div. 0.5ms/div. Normal mode: The defect part passes 800µm(B.D) 

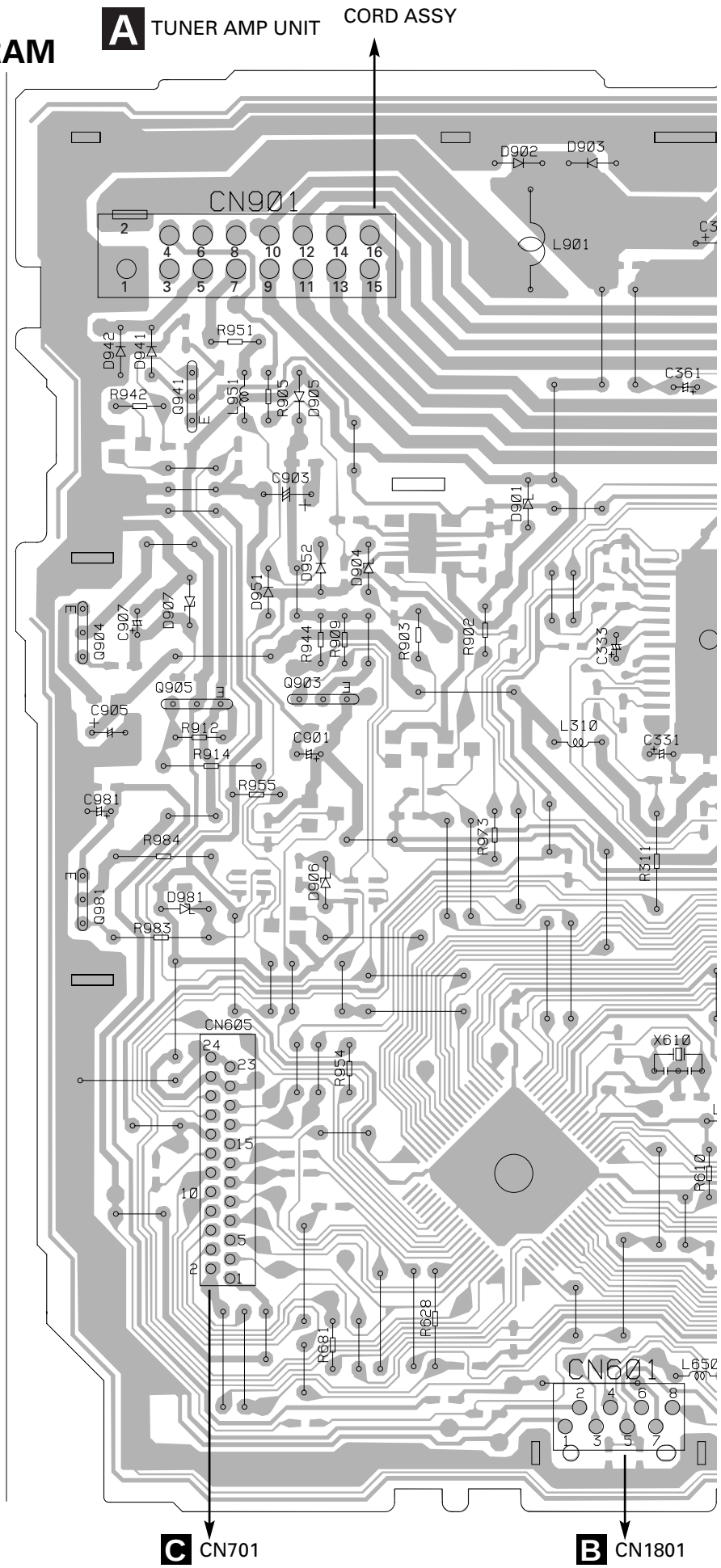
4. PCB CONNECTION DIAGRAM

4.1 TUNER AMP UNIT

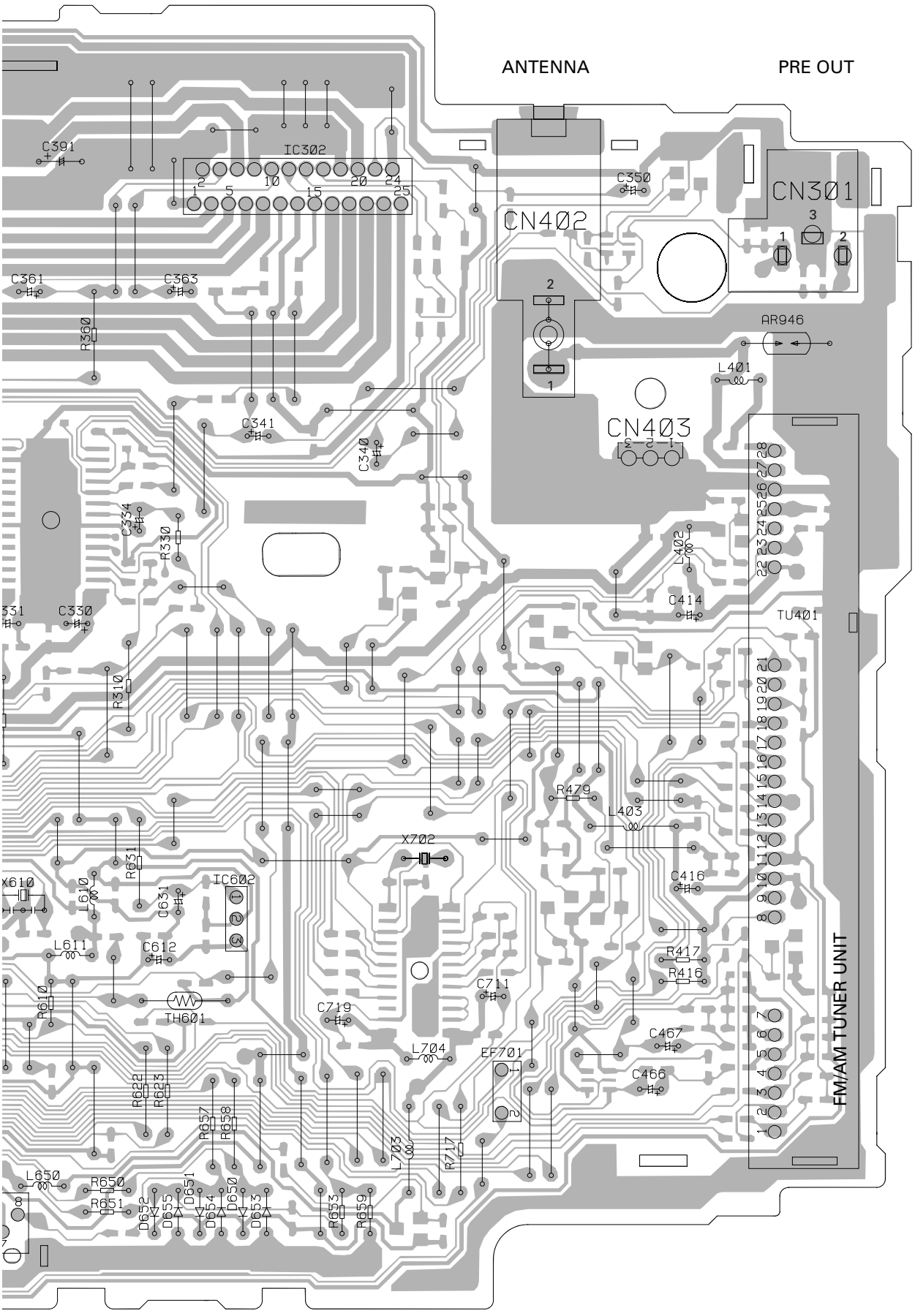
NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams

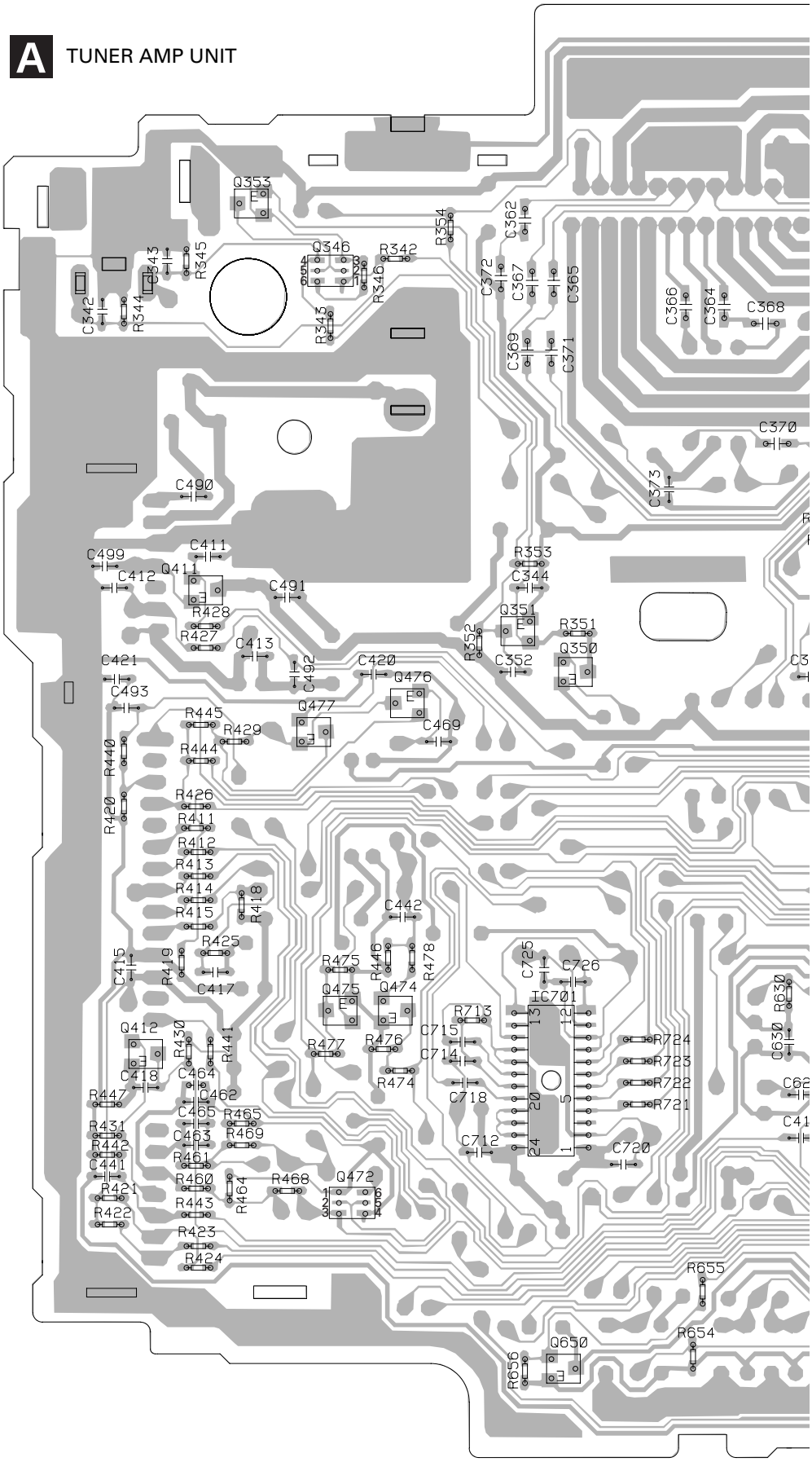




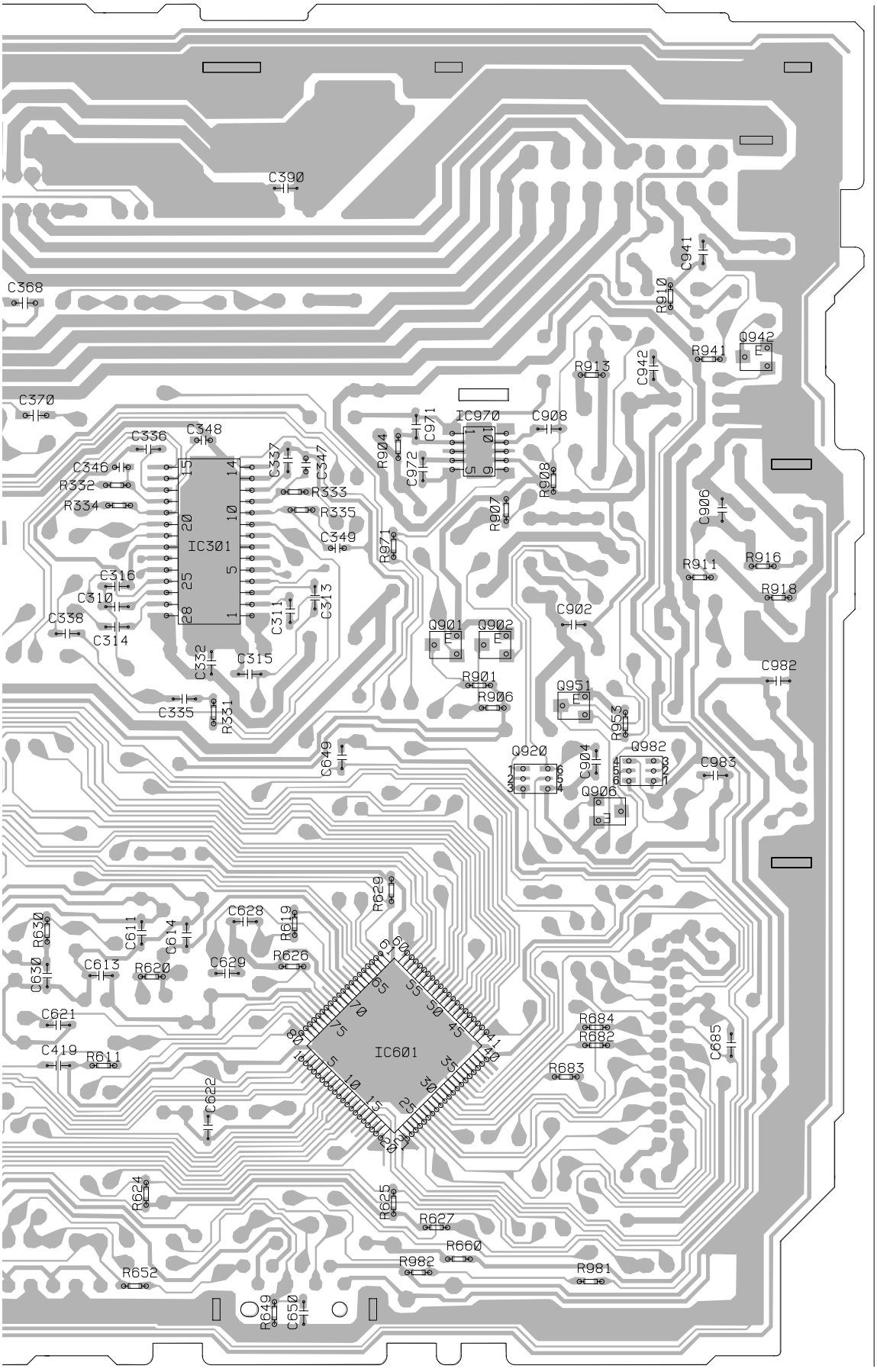
SIDE A


ANTENNA
PRE OUT
FRONT
FM/AM TUNER UNIT
CN301
CN402
CN403
IC302
IC602
TU401
EF701
TH601
X702
AR946
C391
C350
C361
C363
R360
C341
C340
C334
R330
C330
R310
L402
C414
L401
R479
L403
C416
R417
R416
C711
C719
C467
C466
L704
L703
R717
C631
C612
L611
L610
X610
R631
R610
R622
R623
R657
R658
L650
R650
R651
D652
D655
D651
D654
D650
D653
R653
R659

A TUNER AMP UNIT



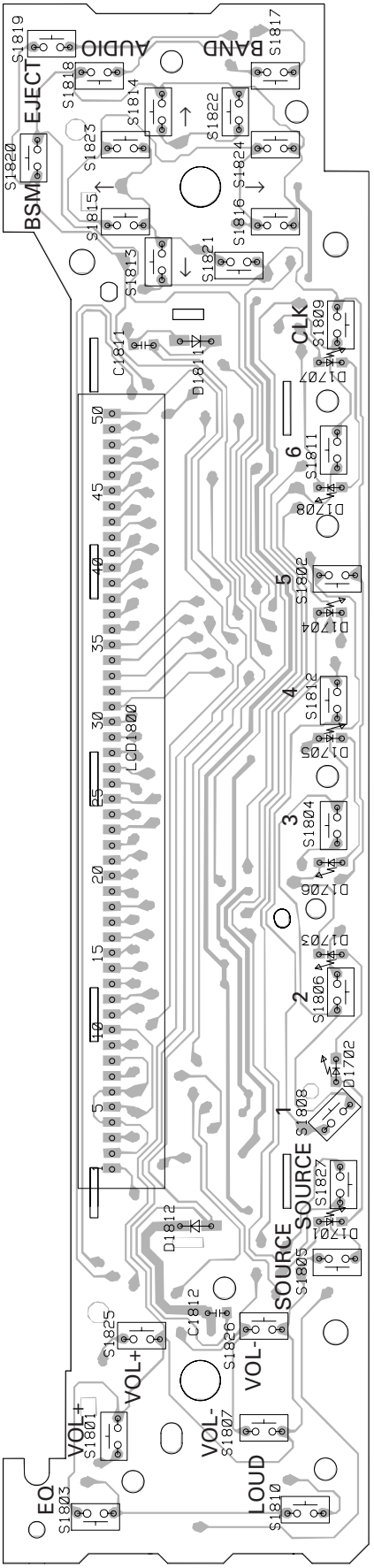
SIDE B


C390
C368
C370
C336
C348
C346
R332
R334
C337
C347
R333
R335
C349
IC301
C316
C310
C338
C314
C311
C313
C332
C315
C335
R331
C649
R971
R904
C972
C971
IC970
C908
R908
R907
C902
Q901
Q902
R901
R906
Q951
R953
Q920
C904
Q982
C983
Q906
C982
C906
R911
R916
R918
C941
R910
Q942
R941
R913
C942
C628
R619
R629
C611
C614
R630
C630
C613
R620
C629
R626
C621
C419
R611
C622
IC601
R684
R682
R683
C685
R624
R625
R627
R660
R982
R981
R652
R649
C650
IC, Q
Q353
Q346
Q942
IC970
Q411
IC301
Q351
Q350
Q901 Q902
Q476
Q477
Q951
Q920 Q982
Q906
Q475 Q474
IC701
Q412
IC601
Q472
Q650
A
B
C
D

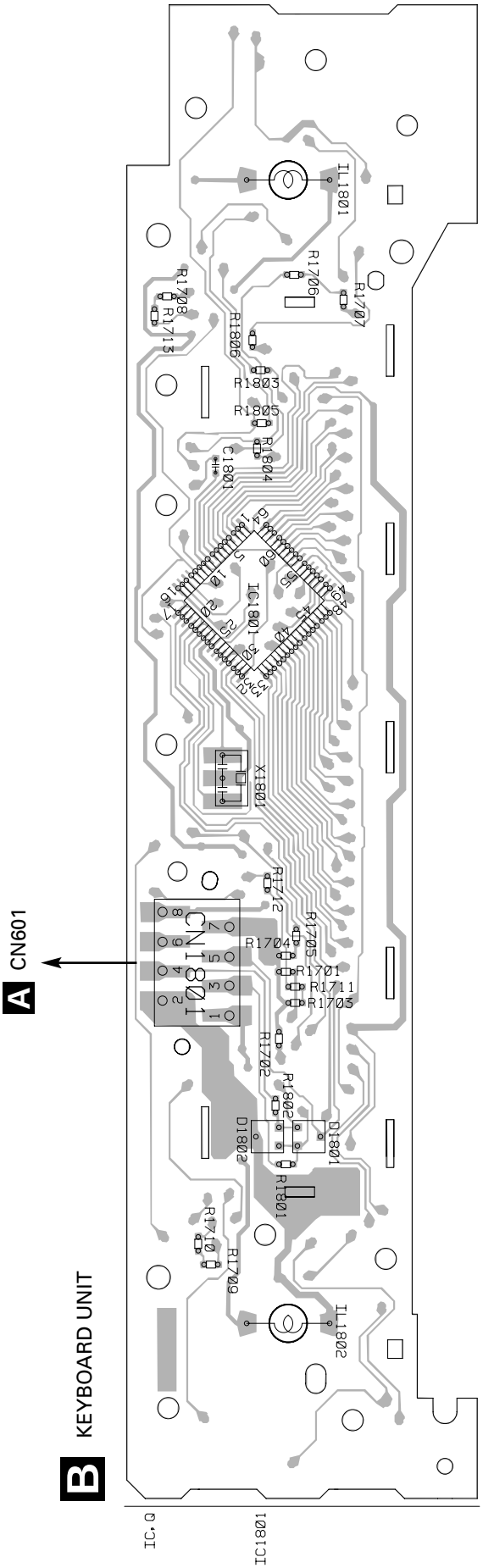
FRONT

4.2 KEYBOARD UNIT

SIDE A

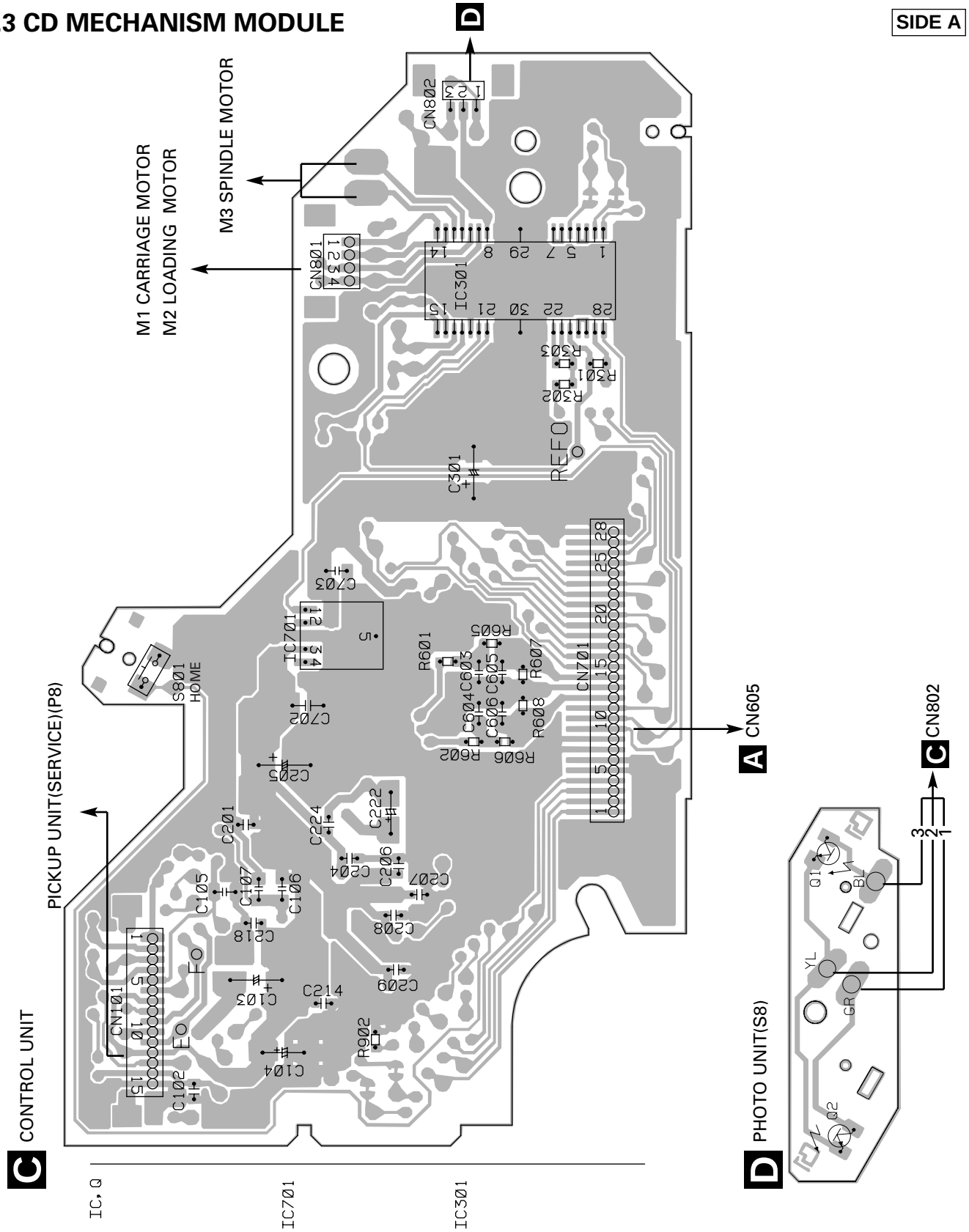


SIDE B

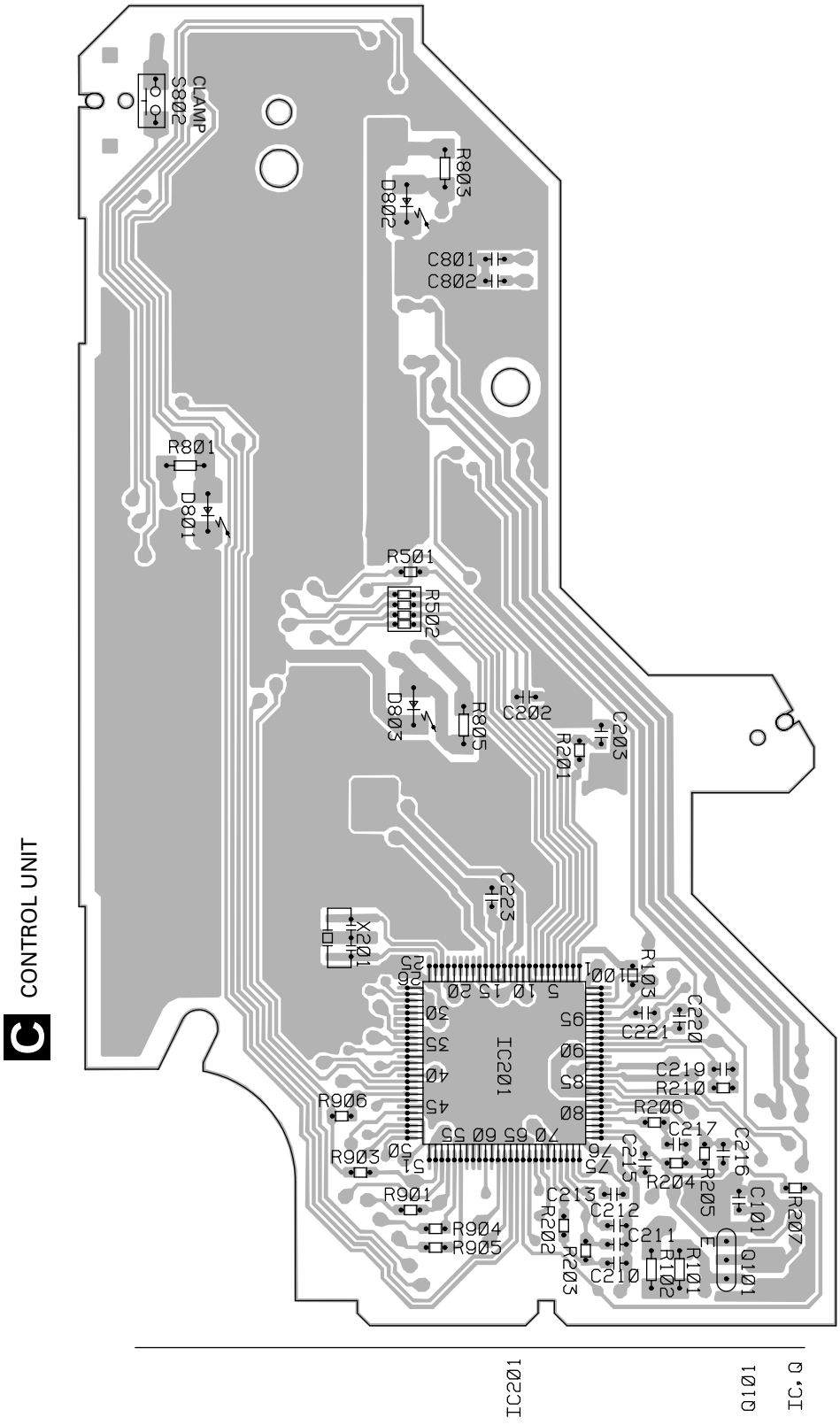

IL1801
R1706
R1707
R1708
R1713
R1806
R1803
R1805
R1804
C1801
IC1801
X1801
R1712
R1705
R1704
R1701
R1711
R1703
CN1801
R1702
R1802
D1802
D1801
R1801
R1710
R1709
IL1802
A CN601
B KEYBOARD UNIT
IC1801

4.3 CD MECHANISM MODULE

SIDE A



SIDE B



C CONTROL UNIT

A
B
C
D

5. ELECTRICAL PARTS LIST

NOTES:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

A Unit Number : CWM7293(DEH-2350/X1M/ES)
: CWM7297(DEH-1350/X1M/ES)
Unit Name : Tuner Amp Unit

MISCELLANEOUS

=====Circuit Symbol and No.		===Part Name	Part No.
IC	301	IC	PML003AM
IC	302	IC(DEH-2350/X1M/ES)	PAL006A
IC	302	IC(DEH-1350/X1M/ES)	TDA7386
IC	601	IC	PE5196A
IC	602	IC	S-80834ANY
IC	970	IC(DEH-1350/X1M/ES)	TPD1018F
Q	346	Transistor	RN1610
Q	350	Transistor	DTA124EK
Q	351	Transistor	DTC114EK
Q	353	Transistor	DTA124EK
Q	411	Transistor	2SC2412K
Q	650	Transistor	2SA1037K
Q	901	Transistor	2SC2412K
Q	902	Transistor	2SC2412K
Q	903	Transistor	2SD1859
Q	904	Transistor	2SD2396
Q	905	Transistor	2SB1243
Q	906	Transistor	DTC114EK
Q	920	Transistor	RN46A1
Q	981	Transistor	2SD2396
Q	982	Transistor	RN46A1
D	650	Diode	1SS270
D	651	Diode	1SS270
D	652	Diode	1SS270
D	653	Diode	1SS270
D	654	Diode	1SS270
D	655	Diode	1SS270
D	901	Diode	HZS7L(C2)
D	902	Diode	S5688G
D	903	Diode	S5688G
D	904	Diode	HZS7L(A1)
D	905	Diode	S5688G
D	906	Diode	HZS6L(B2)
D	907	Diode	HZS9L(B3)
D	941	Diode	S5688G
D	942	Diode	S5688G
D	981	Diode	HZS9L(B1)
L	310	Ferri-Inductor	LAU1R0M
L	401	Ferri-Inductor	LAU4R7K
L	402	Ferri-Inductor	LAU2R2K
L	403	Inductor	LAU100K
L	610	Ferri-Inductor	LAU101K
L	611	Ferri-Inductor	LAU2R2K
L	650	Ferri-Inductor	LAU2R2K
L	901	Choke Coil 600µH	CTH1221
X	610	Crystal Resonator 4.194304MHz	CSS1023
AR	946	Arrester	DSP-201M-S00B
		FM/AM Tuner Unit	CWE1563

RESISTORS

=====Circuit Symbol and No.		===Part Name	Part No.
R	310		RD1/4PU222J
R	311		RD1/4PU222J
R	332		RS1/16S221J
R	333		RS1/16S221J
R	334		RS1/16S221J
R	335		RS1/16S221J
R	342		RS1/16S681J
R	343		RS1/16S681J
R	344		RS1/16S223J
R	345		RS1/16S223J
R	346		RS1/16S0R0J
R	351		RS1/16S102J
R	352		RS1/16S103J
R	353		RS1/16S103J
R	354		RS1/16S331J
R	360		RD1/4PU153J
R	411		RS1/16S681J
R	412		RS1/16S681J
R	413		RS1/16S681J
R	414		RS1/16S103J
R	415		RS1/16S681J
R	416		RD1/4PU473J
R	417		RD1/4PU472J
R	418		RS1/16S473J
R	419		RS1/16S473J
R	420		RS1/16S473J
R	421		RS1/16S473J
R	422		RS1/16S473J
R	423		RS1/16S681J
R	424		RS1/16S681J
R	425		RS1/16S393J
R	427		RS1/16S222J
R	428		RS1/16S222J
R	460		RS1/16S272J
R	461		RS1/16S272J
R	464		RS1/16S162J
R	465		RS1/16S162J
R	468		RS1/16S0R0J
R	469		RS1/16S0R0J
R	610		RD1/4PU203J
R	611		RS1/16S273J
R	619		RS1/16S0R0J
R	620		RS1/16S223J
R	622		RD1/4PU222J
R	623		RD1/4PU222J
R	624		RS1/16S473J
R	625		RS1/16S473J
R	626		RS1/16S473J
R	627		RS1/16S473J
R	628		RD1/4PU222J

Circuit Symbol and No.		Part Name	Part No.
R	629		RS1/16S473J
R	630		RS1/16S822J
R	631		RD1/4PU102J
R	649		RS1/16S222J
R	650		RD1/4PU222J
R	651		RD1/4PU222J
R	652		RS1/16S472J
R	653		RD1/4PU222J
R	654		RS1/16S473J
R	655		RS1/16S103J
R	656		RS1/16S103J
R	657		RD1/4PU102J
R	658		RD1/4PU102J
R	660		RS1/16S1R0J
R	681		RD1/4PU681J
R	682		RS1/16S102J
R	683		RS1/16S102J
R	684		RS1/16S102J
R	901		RS1/16S104J
R	902		RD1/4PU104J
R	903		RD1/4PU103J
R	904		RS1/16S473J
R	905		RD1/4PU102J
R	906		RS1/16S473J
R	907		RS1/16S473J
R	908		RS1/16S472J
R	909		RD1/4PU103J
R	910		RS1/16S0R0J
R	911		RS1/16S122J
R	912		RD1/4PU103J
R	913		RS1/16S101J
R	914		RD1/4PU152J
R	916		RS1/16S221J
R	918		RS1/16S1R0J
R	944		RD1/4PU152J
R	971	(DEH-1350/X1M/ES)	RS1/16S103J
R	981		RS1/16S472J
R	982		RS1/16S222J
R	983		RD1/4PU221J
R	984		RD1/4PU221J

CAPACITORS

Circuit Symbol and No.		Part Name	Part No.
C	310		CKSRYB105K6R3
C	311		CKSRYB104K16
C	313		CKSRYB105K6R3
C	314		CKSRYB104K16
C	315		CKSRYB102K50
C	316		CKSRYB102K50
C	330		CEJA470M10
C	331		CEJA100M16
C	332		CKSRYB104K16
C	333		CEJA4R7M35
C	334		CEJA4R7M35
C	336		CKSRYB153K25
C	337		CKSRYB153K25
C	340		CEAL2R2M50
C	341		CEJA2R2M50
C	346		CCSRCH100D50
C	347		CCSRCH100D50
C	348		CCSRCH100D50
C	349		CCSRCH100D50
C	350		CEJA330M10
C	361		CEJA2R2M50
C	362		CKSQYB225K10
C	363		CEJA100M16
C	364		CKSQYB474K16
C	365		CKSQYB474K16
C	366		CKSQYB474K16
C	367		CKSQYB474K16
C	368		CKSQYB474K16
C	369		CKSQYB474K16
C	370		CKSQYB474K16
C	371		CKSQYB474K16
C	372		CKSQYB225K10
C	373	(DEH-2350/X1M/ES)	CKSRYB473K25
C	390		CKSRYB104K16
C	391	3300µF/16V	CCH1368
C	411		CKSRYB223K25
C	412		CKSRYB223K25
C	413		CKSRYB102K50
C	414		CEJA220M10
C	415		CKSRYB473K16
C	416		CEAL101M10
C	417		CKSRYB472K50
C	419		CCSRCH101J50
C	420		CCSRCH101J50
C	462		CKSRYB183K25
C	463		CKSRYB183K25
C	490		CKSQYB103K50
C	499		CKSRYB103K50
C	612		CEJA4R7M35
C	613		CKSRYB473K16
C	614		CCSRCH101J50
C	628		CCSRCH150J50
C	629		CCSRCH150J50
C	630		CKSRYB473K16
C	631		CEAL2R2M50
C	650		CKSRYB104K16
C	901		CEJA101M10
C	902		CKSRYB473K16
C	903	470µF/16V	CCH1331
C	904		CKSRYB473K16
C	905	330µF/16V	CCH1326
C	906		CKSRYB103K50
C	907		CEJA101M16
C	941		CKSRYB473K16
C	971	(DEH-1350/X1M/ES)	CKSRYB103K50
C	972	(DEH-1350/X1M/ES)	CKSRYB473K16
C	981		CEJA101M10
C	982		CKSRYB102K50
C	983		CKSRYB473K16

B Unit Number : CWM7303(DEH-2350/X1M/ES)
: CWM7307(DEH-1350/X1M/ES)
Unit Name : Keyboard Unit

MISCELLANEOUS

Circuit Symbol and No.		Part Name	Part No.
IC	1801	IC	PD6340A
D	1701	LED	SML210PT
D	1702	LED	SML210PT
D	1703	LED	SML210PT
D	1704	LED	SML210PT
D	1705	LED	SML210PT
D	1706	LED	SML210PT
D	1707	LED	SML210PT
D	1708	LED	SML210PT
D	1801	Diode	MA152WK
D	1802	Diode	MA152WA
D	1811	LED	NSSW440-9159
D	1812	LED	NSSW440-9159
X	1801	Ceramic Resonator 4.97MHz	CSS1422
IL	1801	Lamp 14V 40mA	CEL1651
IL	1802	Lamp 14V 40mA	CEL1651
		LCD(DEH-2350/X1M/ES)	CAW1606
		LCD(DEH-1350/X1M/ES)	CAW1633

Circuit Symbol and No.	Part Name	Part No.
RESISTORS		
R 1701		RS1/16S151J
R 1702		RS1/16S181J
R 1703		RS1/16S181J
R 1704		RS1/16S181J
R 1705		RS1/16S181J
R 1706		RS1/16S151J
R 1707		RS1/16S151J
R 1708		RS1/16S151J
R 1709		RS1/16S181J
R 1710		RS1/16S151J
R 1711		RS1/16S181J
R 1712		RS1/16S151J
R 1713		RS1/16S131J
R 1801		RS1/16S222J
R 1802		RS1/16S222J
R 1803		RS1/16S471J
R 1804		RS1/16S471J
R 1805		RS1/16S471J
R 1806		RS1/16S471J
CAPACITORS		
C 1801		CKSRYB103K50
C 1811		CKSQYF104Z25
C 1812		CKSQYF104Z25

C Unit Number : CWX2411
Unit Name : Control Unit

MISCELLANEOUS			
IC	201	IC	UPD63711GC
IC	301	IC	BA5985FM
IC	701	IC	BA05SFP
Q	101	Transistor	2SB1132
D	801	LED	CL203IRXTU
D	802	LED	CL203IRXTU
X	201	Ceramic Oscillator 16.934MHz	CSS1456
S	801	Spring Switch(HOME)	CSN1051
S	802	Spring Switch(CLAMP)	CSN1052

RESISTORS			
R	101		RS1/8S120J
R	102		RS1/8S100J
R	103		RS1/16S222J
R	201		RS1/16S104J
R	202		RS1/16S103J
R	203		RS1/16S393J
R	204		RS1/16S103J
R	205		RS1/16S103J
R	206		RS1/16S182J
R	207		RS1/16S123J
R	302		RS1/16S153J
R	303		RS1/16S103J
R	501		RS1/16S102J
R	502		RA4C681J
R	601		RS1/16S102J
R	602		RS1/16S102J
R	605		RS1/16S0R0J
R	606		RS1/16S0R0J
R	801		RS1/8S751J
R	803		RS1/8S751J
R	902		RS1/16S0R0J
R	906		RS1/16S0R0J

Circuit Symbol and No.	Part Name	Part No.
CAPACITORS		
C 101		CKSRYB102K50
C 102		CKSRYB104K16
C 103		CEV101M6R3
C 104		CEV470M6R3
C 105		CKSQYB334K16
C 106		CKSQYB334K16
C 107		CKSQYB334K16
C 201		CKSRYB104K16
C 202		CKSRYB471K50
C 203		CKSRYB104K16
C 205		CEV101M6R3
C 206		CKSRYB104K16
C 207		CKSRYB104K16
C 208		CKSRYB104K16
C 209		CKSRYB104K16
C 210		CKSRYB332K50
C 211		CKSRYB104K16
C 212		CKSRYB104K16
C 213		CKSRYB392K50
C 214		CKSRYB104K16
C 215		CKSRYB104K16
C 216		CCSRCJ3R0C50
C 217		CCSRCH270J50
C 218		CKSRYB104K16
C 219		CCSRCH181J50
C 220		CCSRCH510J50
C 221		CKSRYB682K25
C 222		CEV220M6R3
C 223		CKSRYB103K25
C 224		CKSRYB224K10
C 301		CEV101M10
C 603		CCSQSL152J50
C 604		CCSQSL152J50
C 702	10µF/10V	CCH1349
C 703		CKSQYB334K16

D Unit Number :
Unit Name : Photo Unit(S8)

Q	1	Photo-transistor	CPT230SX-TU
Q	2	Photo-transistor	CPT230SX-TU

Miscellaneous Parts List

		Pickup Unit(Service)(P8)	CXX1285
M	1	Motor Unit(CARRIAGE)	CXB2190
M	2	Motor Unit(LOADING)	CXB2195
M	3	Motor Unit(SPINDLE)	CXB2562
		Fuse(10A)	CEK1136

6. ADJUSTMENT

6.1 CD ADJUSTMENT

1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND.
  If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
  Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
  If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit.Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
  *During PLAY, even if the eject button is pressed,the disc will not be ejected and the unit will remain in the PLAY mode.
  *The unit will not load a disc.
  When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.

2) Test Mode

This mode is used for adjusting the CD mechanism module of the device.

- Test mode starting procedure
  Reset while pressing the **4** and **6** keys together.

- Test mode cancellation
  Switch ACC, back-up OFF.

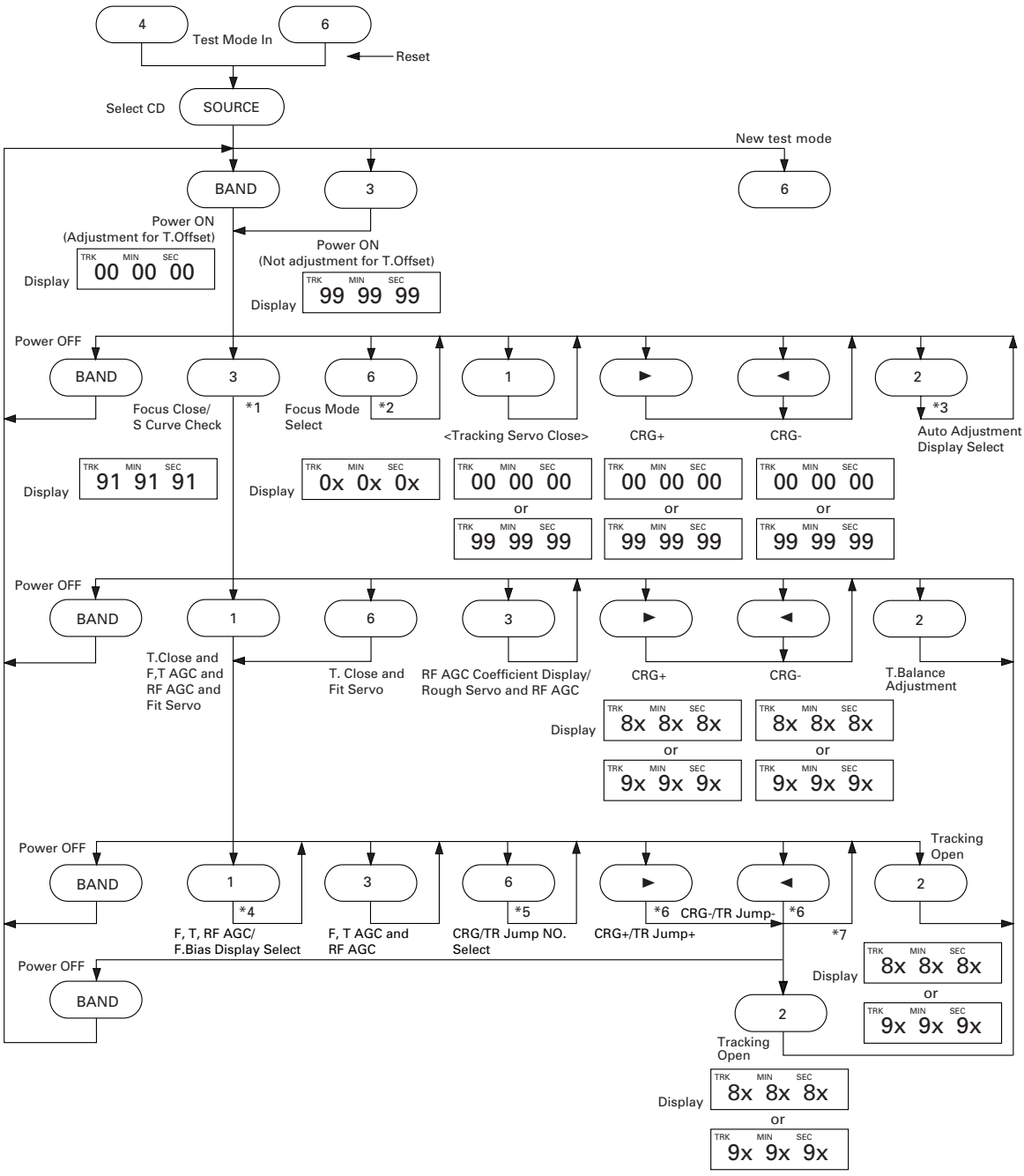
- After pressing the EJECT key, do not press any other key until the disk is completely ejected.

- If the ► or ◄ key is pressed while focus search is in progress, immediately turn the power off (otherwise the actuator may be damaged due to adhesion of the lenses).

- Jump operation of TRs other than 100TR continues after releasing the key. CRG move and 100TR jump operations are brought into the “Tracking close” status when the key is released.

- Powering Off/On resets the jump mode to “1TR”, and the automatic adjustment value to the initial value.

● Flow Chart



*1 "00", "99"→Focus Close / "01"→S.Curve

*2 → Focus Close 00(99) → S.Curve 01 → LD Off 02 →

*3 → F.Cancel → T.Offset → The original display →

*4 → TRK, MIN, SEC → F.AGC Gain → T.AGC Gain → F.Bias

*5 → 1TR 91(81) → 4TR 92(82) → 10TR 93(83) → 32TR 94(84) → 100TR 95(85) → CRG Move 96(86) →

*6 1TR/4TR/10TR/32TR/100TR

*7 CRG Move,100TR Jump

6.2 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

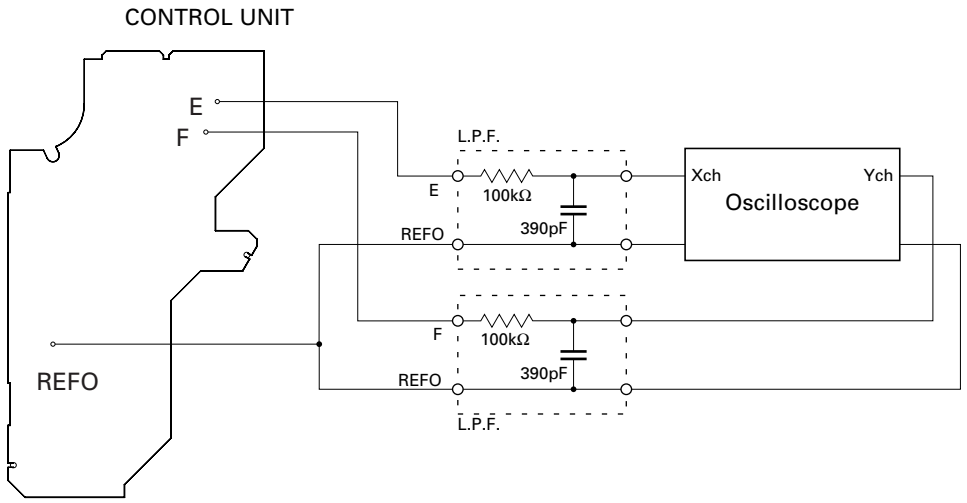
• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

• Measuring Equipment	• Oscilloscope, Two L.P.F.
• Measuring Points	• E, F, REFOUT
• Disc	• ABEX TCD-784
• Mode	• TEST MODE



• **Checking Procedure**
1. In test mode, load the disc and switch the 5V regulator on.
2. Using the ► and ◄ buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3** 2 times. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

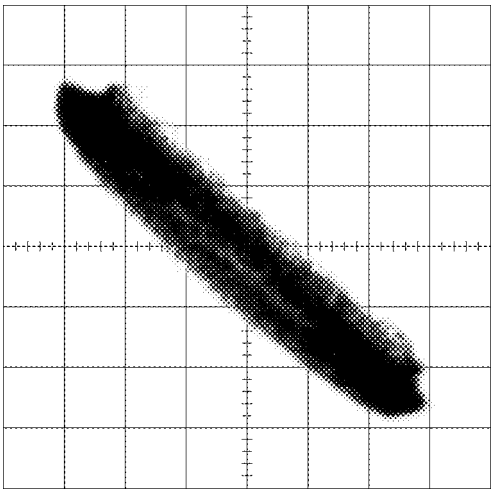
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" (the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

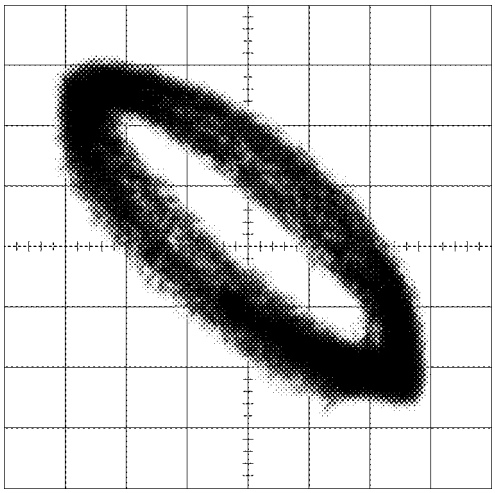
Grating waveform

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

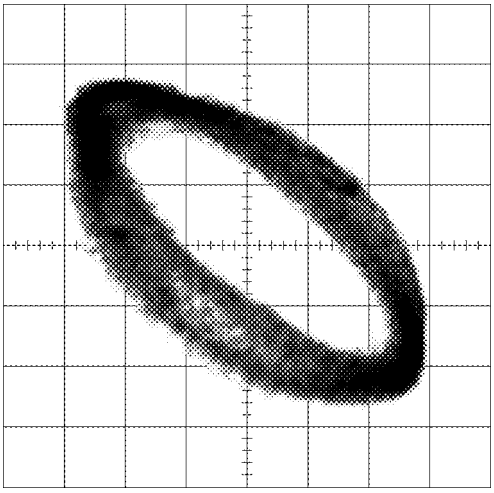
0°



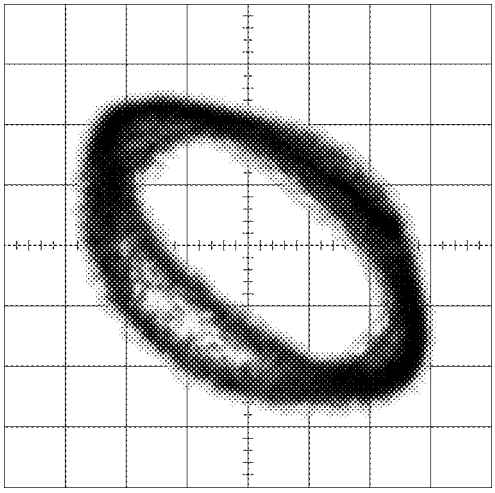
30°



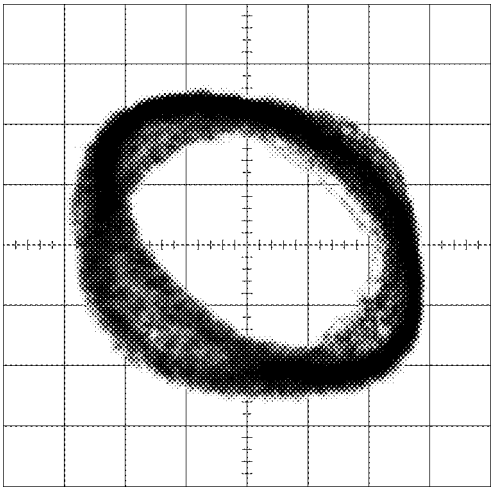
45°



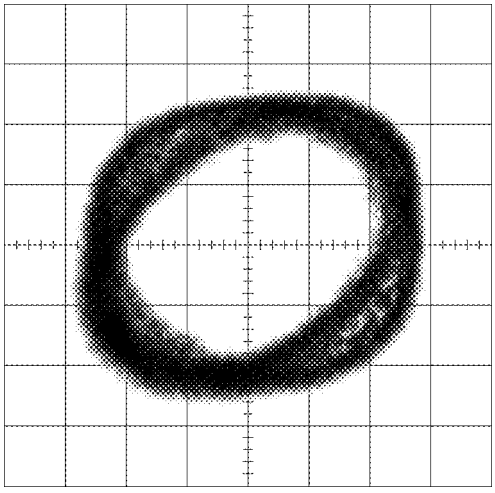
60°



75°



90°



7. GENERAL INFORMATION

7.1 DIAGNOSIS

7.1.1 TEST MODE

● Error Messages

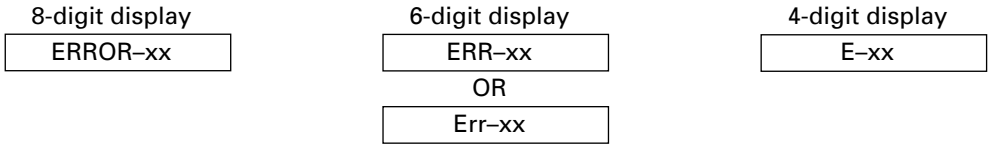
If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.



(2) Error Code List

Code	Class	Displayed error code	Description of the code and potential cause(s)
10	Electricity	Carriage Home NG	CRG can't be moved to inner diameter. CRG can't be moved from inner diameter. → Failure on home switch or CRG move mechanism.
11	Electricity	Focus Servo NG	Focusing not available. → Stains on rear side of disc or excessive vibrations on REWRITABLE.
12	Electricity	Spindle Lock NG	Spindle not locked. Sub-code is strange (not readable). → Failure on spindle, stains or damages on disc, or excessive vibrations.
		Subcode NG	A disc not containing CD-R data is found. Turned over disc are found, though rarely. → Failure on home switch or CRG move mechanism.
		RF AMP NG	An appropriate RF AMP gain can't be determined. → CD signal error.
17	Electricity	Setup NG	APC protection doesn't work. Focus can be easily lost. → Damages or stains on disc, or excessive vibrations.
30	Electricity	Search Time Out	Failed to reach target address. → CRG tracking error or damages on disc.
A0	System	Power Supply NG	Power (VD) is ground faulted. → Failure on SW transistor or power supply (failure on connector).

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).

Unreadable TOC does not constitute an error. An intended operation continues in this case.

A newly designed head unit must conform to the example given above.

Upper digits of an error code are subdivided as shown below:

1x: Setup relevant errors, 3x: Search relevant errors, 3x: Search relevant errors, Ax: Other errors.

● New Test Mode

S-CD plays the same way as before.

If an error such as off focus, spindle unlocking, unreadable sub-code, or sound skipping occurs after setup, its cause and time occurred (in absolute time) are displayed.

During setup, operational status of the control software (internal RAM: CPOINT) is displayed.

These displays and functions are prepared for enhancing aging in the servicing and efficiency of trouble analysis.

(1) Shifting to the New Test Mode

① Turn on the current test mode by starting the reset from the key.

② Select S-CD for the source through the specified procedure including use of the [SOURCE] key, and inserting the disc. Then, press the [Jump Mode Selector] key while maintaining the regulator turned off.

③ After the above operations, the new test mode remains on irrespective of whether the S-CD is turned on or off. You can reset the new test mode by turning on the reset start.

* With some products, the new test mode can be reset through the same operations as that employed for shifting to the STBY mode (while maintaining the Acc turned off).

(2) Key Correspondence

Key	Test mode		New test mode	
(Example)	Power Off	Power On	In-play	Error Production
BAND	To power on (offset adjustment performed)	To power off	–	Time/Err.No. switching
►	–	FWD-Kick	FF/TR+	–
◄	–	REV-Kick	REV/TR-	–
1	–	T.Close (AGC performed) /parameter display switching	Scan	–
2	–	T.BAL adjustment /T.Open	Mode	–
3	To power on (offset adjustment not performed)	F.Close/RF AGC/AGC	–	–
6	–	Mode switching /T.Close (no AGC)/Jump switching	Auto/Manu	–

Note: Eject and CD on/off is performed in the same procedure as that for the normal mode.

(3) Cause of Error and Error Code

Code	Class	Contents	Description and cause
40	Electricity	Off focus detected.	FOK goes low. → Damages/stains on disc, vibrations or failure on servo.
41	Electricity	Spindle unlocked.	FOK = Low continued for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
42	Electricity	Sub-code unreadable.	Sub-code was unreadable for 50 msec. → Damages/stains on disc, vibrations or failure on servo.
43	Electricity	Sound skipping detected.	Last address memory function was activated. → Damages/stains on disc, vibrations or failure on servo.

Note: Mechanical errors during aging are not displayed.

The error codes should be indicated in the same way as in the normal mode.

(4) Display of Operational Status (CPOINT) during Setup

Status No.	Contents	Protective action
01	Carriage move to home position started.	None
02	Carriage is moving toward inner diameter.	Specified 10 seconds has been passed or failure on home switch.
03	Carriage is moving toward outer diameter.	Specified 10 seconds has been passed or failure on home switch.
05	Carriage outer diameter feed (1 second) in progress.	None
11	Setup started.	None
12	Spindle rotation and focus search started.	None
13	Waiting for focus close (XSI=Low).	Specified focus search time has been passed.
14	Waiting for focus close (FOK=High). (After AGC)	Specified focus search time has been passed.
15	Waiting for focus close (FOK=High). (Before AGC)	Specified focus search time has been passed.
16	Rough AGC in progress.	Off focus.
17	Setup (1/2) before T balance adjustment is started.	Off focus.
18	Setup (2/2) before T balance adjustment is started.	Off focus.
24	T balance adjustment (1/2).	Off focus.
25	T balance adjustment (2/2).	Off focus.
26	Standing by after spindle rough servo is over.	Off focus.
27	Setup before RF AGC (first) is started.	Off focus.
28	RF AGC (first) in progress.	Off focus.
29	Setup before RF AGC (second) is started.	Off focus.
30	RF AGC (second) in progress.	Off focus.
31	Tracking close in progress.	Off focus.
32	Standing by after tracking is closed.	Off focus.
33	Focus AGC started.	Off focus.
34	Focus AGC in progress. Tracking AGC started.	Off focus.
35	Tracking AGC in progress. Spindle processes applicable servo.	Off focus.
36	Check of MIRR and LOCK pin. RF AGC in progress. CRG close in progress. Check of sub-code.	Off focus. Spindle not locked. Sub-code unreadable.

(5) Display Examples

1) During Setup (When status no. = 11)

TRK No.	MIN.	SEC.
11	11'	11"

2) During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

3) When a Protection Error Occurred

Switch to the following displays (A) and (B) using the [BAND] switch:

(A) Error occurrence timing display in absolute time.

An example: Error occurred in 12th tune at 34'56" in absolute time.

TRK No.	MIN.	SEC.
12	34'	56"

(B) Error No. display

An example: Error #40 (Off focus is detected)

ERROR-40

7.1.2 DISASSEMBLY

● Removing the Case Unit (not shown)

1. Remove the Case Unit.

● Removing the CD Mechanism Module (Fig.1)

1 Remove the four screws.

Disconnect the connector and then remove the CD Mechanism Module (not shown).

● Removing the Panel Assy (not shown)

1. Disconnect the two stoppers and then remove the Panel Assy.

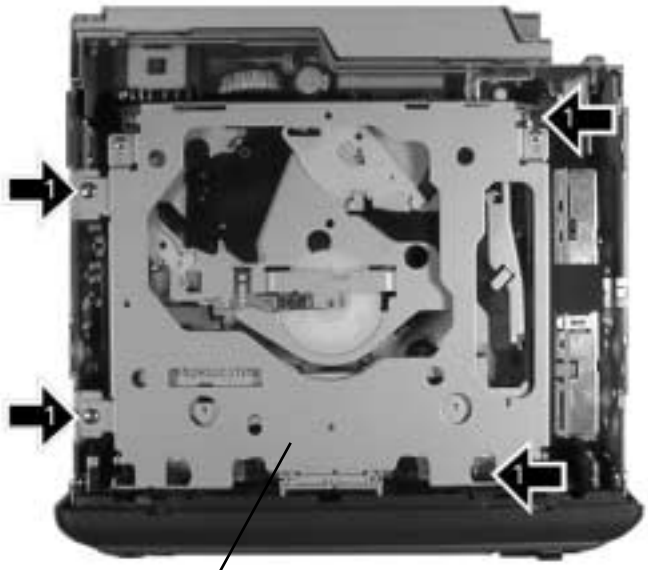


Fig.1

● Removing the Tuner Amp Unit

1 Remove the three screws and then remove the Cover. (Fig.2)

2 Remove the two screws. (Fig.2)

3 Remove the screw. (Fig.3)

4 Straight the tabs at fore locations indicated and then remove the Tuner Amp Unit. (Fig.3)

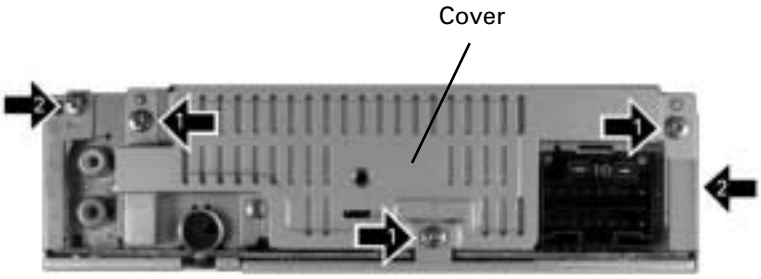


Fig.2

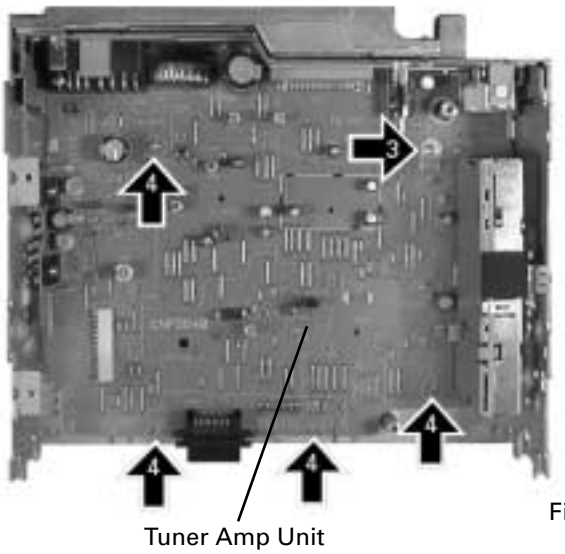
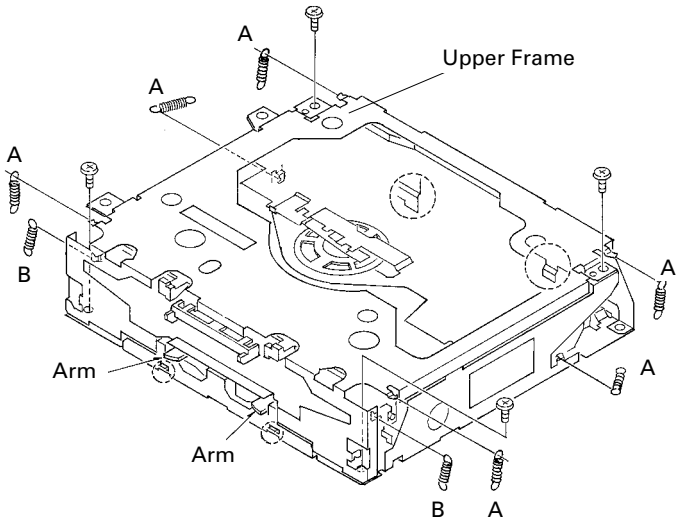


Fig.3

● Removing the Upper Frame

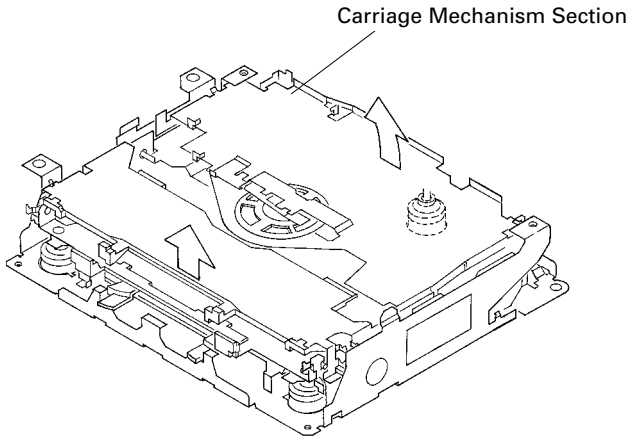
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

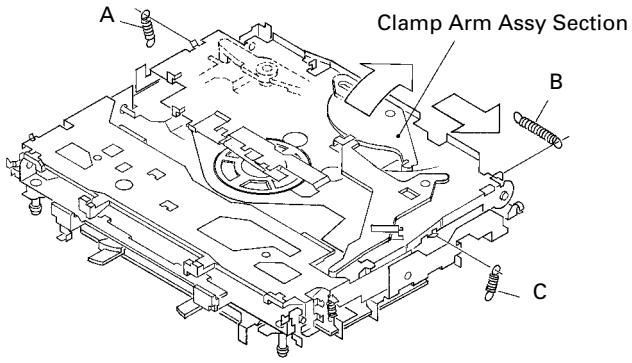
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the one damper by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

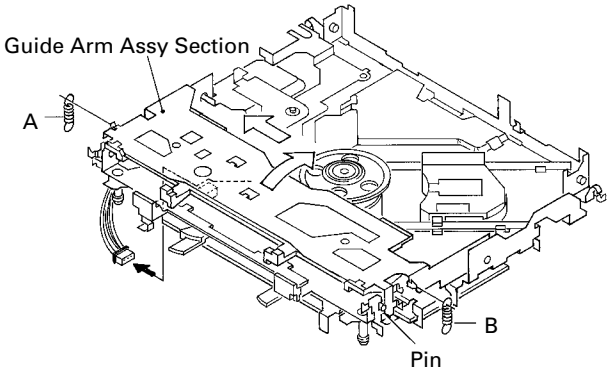
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

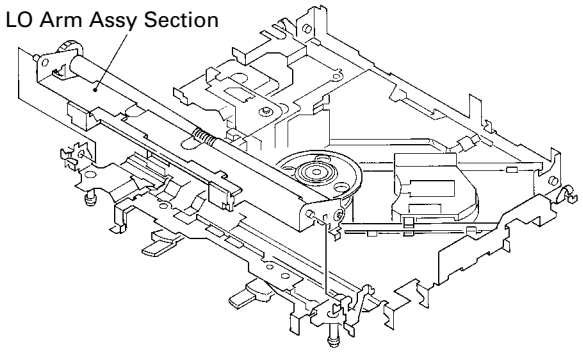
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



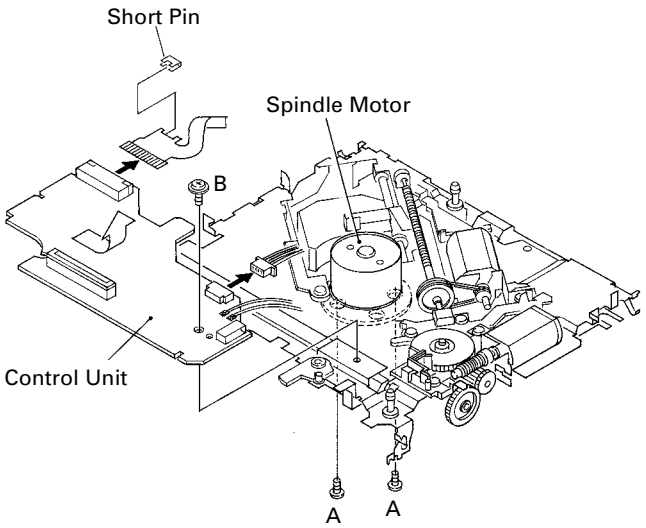
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

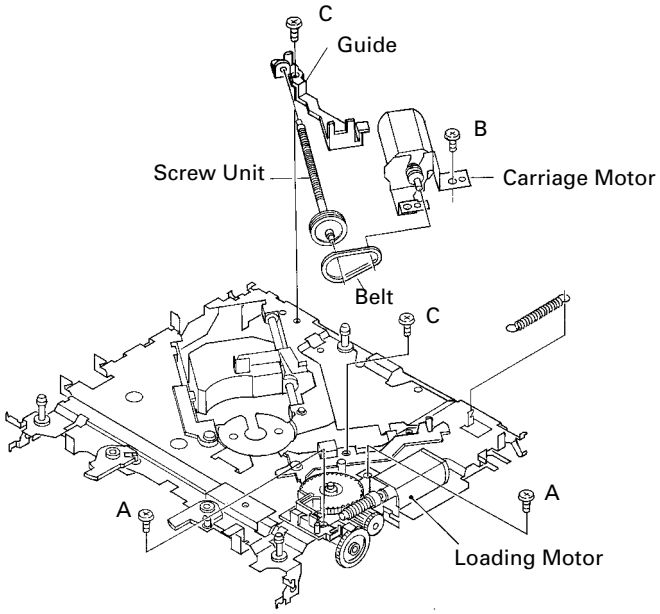
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

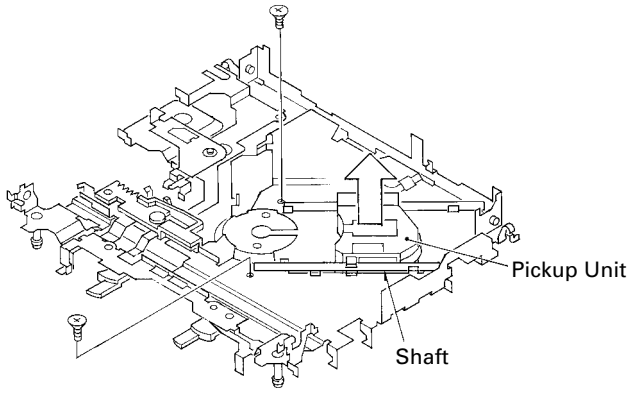
1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.

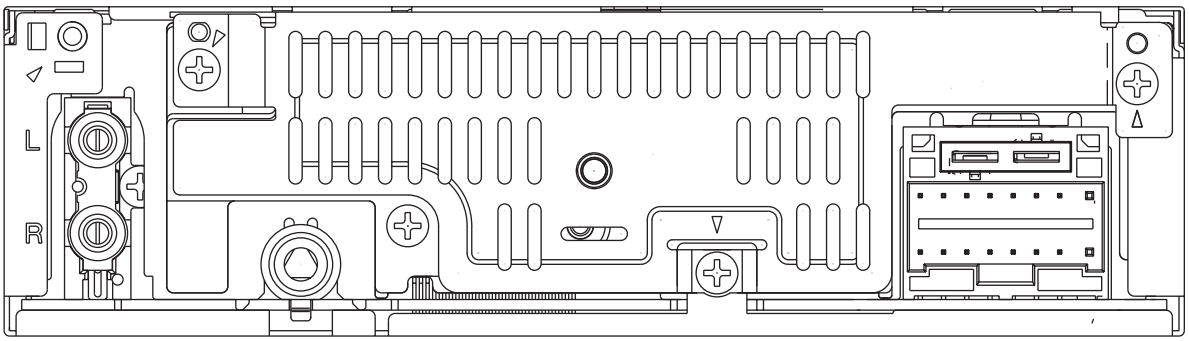


● Removing the Pickup Unit

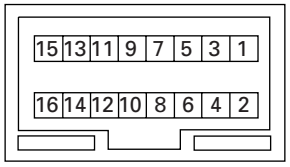
1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.



7.1.3 CONNECTOR FUNCTION DESCRIPTION



PRE OUT ANTENNA



1. BACK UP
2. GND
3. NC
4. ACC
5. B.REM
6. NC
7. NC
8. NC
9. FL-
10. RL-
11. FL+
12. RL+
13. FR-
14. RR-
15. FR+
16. RR+

7.2 PARTS

7.2.1 IC

● **Pin Functions(PE5196A)**

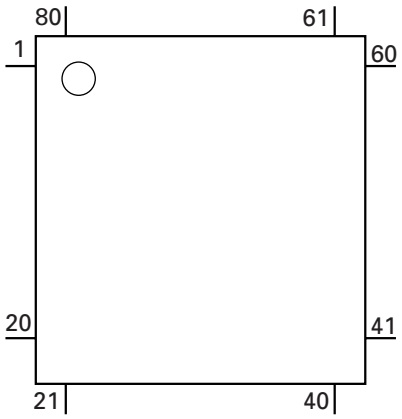
Pin No.	Pin Name	I/O	Format	Function and Operation
1	MODEL1	I		Model select input
2	NL1	I		Noise level input
3	NL2DT	I		Noise level input 2
4	AVSS			AVSS
5	ST	I		Stereo input
6	SD	I		SD signal input
7	AREF1			AVREF1
8	KYDT	I		Key data input
9	DPDT	O	C	Key data output
10	SDBW	I		SDBW input
11	TUNPDI	I		PLL IC data input
12	TUNPDO	O	C	PLL IC data output
13	TUNPCK	O	C	PLL IC clock output
14	TUNPCE	O	C	PLL IC chip enable output
15	$\overline{\text{CURRQ}}$	O	C	Tuner voltage FIX output
16	XSI	I	C	CD LSI serial data input(TSI)
17	XSO	O	C	CD LSI serial data output(TSO)
18	XSCK	O	C	CD LSI serial clock output(TSCK)
19	$\overline{\text{DRST}}$	O	C	RDS decoder reset output
20	ADPW	O	C	A/D converter power output
21	$\overline{\text{FM}}$/AM	O	C	Tuner power supply control output
22	VDCONT	O	C	VD power supply control output
23	CONT	O	C	Servo driver power control output
24	XAO	O	C	CD LSI command / data control output
25	$\overline{\text{XRST}}$	O	C	CD LSI reset control output
26	$\overline{\text{XSTB}}$	O	C	CD LSI strobe output
27	CLAMP	I		Disc clamp sense input
28	MIRR	I		Mirror detection input
29	FOK	I		Focus OK signal input
30	LOCK	I		Spindle lock detector input
31	CDLOAD	O		LOAD motor loading control output
32	TELIN	I		Cellular mute input
33	VSS			VSS
34	CDEJECT	O		LOAD motor eject control output
35	CD5VON	O	C	CD +5V power supply control output
36–39	NC			Not used
40	RECIEVE	O	C	RDS decoder receiving output
41	$\overline{\text{SWVDD}}$	O	C	Grille microcomputer power supply control output
42	SYSPW	O	C	System power supply control output
43	ILMPW	O	C	Illumination power output
44	$\overline{\text{MUTE}}$	O	C	Mute output
45	PEE	O	C	Beep tone output
46	LOCH	O	C	LOCH output
47	RDS57K	I		57kHzBP-OUT sense input
48	TUNPCE2	O	C	EEPROM chip enable output
49	PCL	O	C	Test mode clock adjustment output
50	VCK	O	C	Clock output for electronic volume
51	VDT	O	C	Data output for electronic volume
52	ANTPW	O		Antenna power output
53	VST	O		Strobe pulse output for electronic volume
54	DALMON	O		Stand-by output
55,56	NC			Not used
57	LOCL	O		LOCL output
58	$\overline{\text{RDSLK}}$	I		RDSLK input

Pin No.	Pin Name	I/O	Format	Function and Operation
59	RDT	I		RDS data input
60	$\overline{\text{RESET}}$			Reset
61	LDET	I		PLL lock detection input
62	RCK	I		RDS clock input
63	$\overline{\text{ASENS}}$	I		ACC power sense input
64	$\overline{\text{BSENS}}$	I		Back up power sense input
65	$\overline{\text{DSENS}}$	I		Grille detach sense input
66	TMUTE	O	C	Tuner mute output
67	NC			Not used
68	VDD			VDD
69	X2			Crystal oscillator connection pin
70	X1			Crystal oscillator connection pin
71	IC(VPP)			IC(VPP)
72	NC			Not used
73	TESTIN	I		Test program mode input
74	AVDD			AVDD
75	AVREF0			AVREF0
76	SL	I		Signal level input
77	TEMP	I		Temperature detection input
78	VDSENS	I		VD power supply sense input
79	DINC	I		Disc detection input
80	EJTD	I		Disc eject position detect input

Output Format	Meaning
C	C MOS output

IC's marked by* are MOS type.
Be careful in handing them because they are very liable to be damaged by electrostatic induction.

*PE5196A



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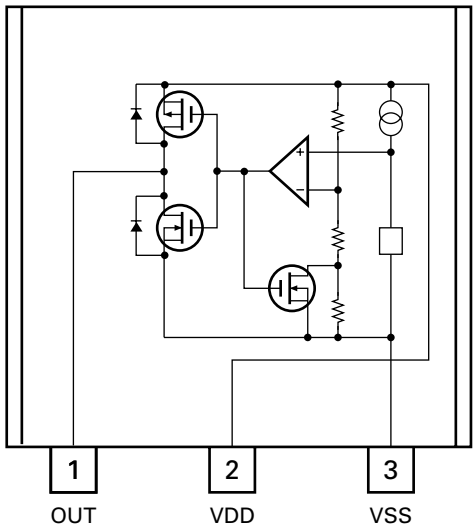
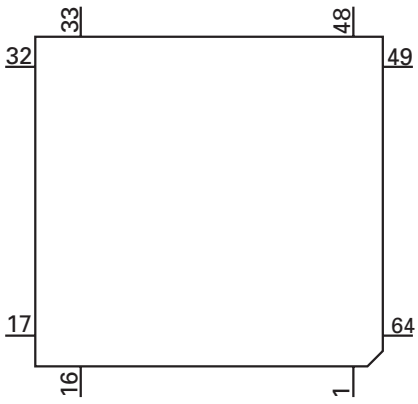


● **Pin Functions (PD6340A)**

Pin No.	Pin Name	I/O	Function and Operation
1-5	SEG4-0	O	LCD segment output
6-9	COM3-0	O	LCD common output
10	VLCD		LCD drive power supply
11-14	KST3-0	O	Key strobe output
15,16	KDT0,1	I	Key data input (analogue input)
17	REM	I	Remote control reception
18	DPDT	I	Display data input
19	NC		Not used
20	KYDT	O	Key data output
21	MODA		GND
22	X0		Crystal oscillator connection pin
23	X1		Crystal oscillator connection pin
24	VSS		GND
25,26	KDT2,3	I	Key data input
27	NC		Not used
28	KST4	O	Key strobe output
29-32	NC		Not used
33-55	SEG35-13	O	LCD segment output
56	VDD		Power supply
57-64	SEG12-5	O	LCD segment output

*PD6340A

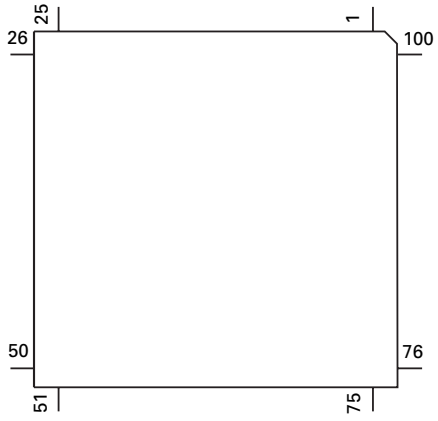


● **Pin Functions (UPD63711GC)**

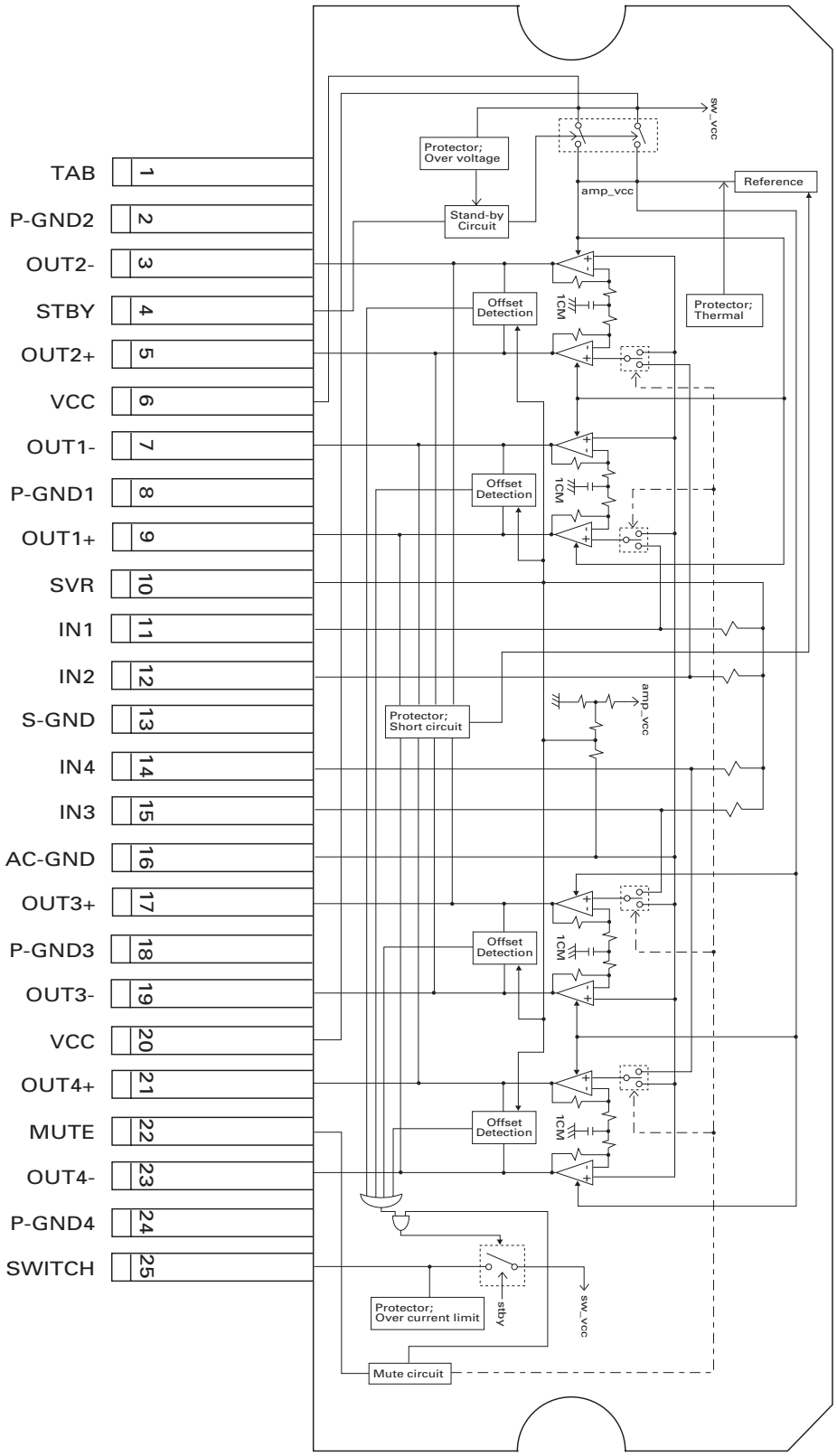
Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK signal output
3	$\overline{RST}$	I	Reset signal input
4	A0	I	Command/parameter identification signal input
5	$\overline{STB}$	I	Data strobe signal input
6	$\overline{SCK}$	I	Clock signal input for serial data input/output
7	SO	O	Serial data and status signal output
8	SI	I	Serial data input
9	$\overline{XTALEN}$	I	Crystal oscillation control pin
10	D.VDD		Positive power supply terminal to logic circuit
11	DA.VDD		Positive power supply terminal to D/A converter
12	R_OUT	O	Right channel audio output signal
13	DA.GND		D/A converter GND
14	REGC	I	The outside putting capacitor connection pin for SCF regulator
15	DA.GND		D/A converter GND
16	L_OUT	O	Left channel audio output signal
17	DA.VDD		Positive power supply terminal to D/A converter
18	R+	O	Right channel audio data output
19	R-	O	Right channel audio data output
20	L-	O	Left channel audio data output
21	L+	O	Left channel audio data output
22	X.VDD		Positive power supply terminal to crystal oscillation circuit
23	XTAL	I	Crystal oscillator connect pin
24	$\overline{XTAL}$	O	Crystal oscillator connect pin
25	X.GND		Crystal oscillation circuit GND
26	D.VDD		Positive power supply terminal to logic circuit
27	EMPH	O	Output pin for the pre-emphasis data in the sub-Q code
28	FLAG	O	Flag output pin to indicate that audio data currently being output consists of noncorrectable data
29	DIN	I	Serial data input to internal DAC
30	DOUT	O	Serial audio data output
31	SCKIN	I	Serial clock input to internal DAC
32	SCKO	O	Audio data that is output from DOUT changes at rising edge of this clock
33	LRCKIN	I	LRCK signal input to internal DAC
34	LRCK	O	Signals to distinguish the right and left channels of the audio data output from DOUT
35	HOLD	O	Defect detection output
36	TX	O	Digital audio interface data output
37	D.GND		Logic circuit GND
38	C16M	O	Oscillator clock buffering output
39	LIMIT	I	Status of the pin is output at Bit 5 of the status output
40	D.VDD		Positive power supply terminal to logic circuit
41	LOCK	O	EFM synchronous detection signal
42	RFCK	O	Frame synchronous signal of XTAL-system
43	MIRR	O	MIRR output
44	PLCK	O	Monitor pin of bit clock
45	D.GND		Logic circuit GND
46	C1D1	O	Output pin for indicating the C1 error correction results
47	C1D2	O	Output pin for indicating the C1 error correction results
48	C2D1	O	Output pin for indicating the C2 error correction results
49	C2D2	O	Output pin for indicating the C2 error correction results
50	C2D3	O	Output pin for indicating the C2 error correction results
51	D.VDD		Positive power supply terminal to logic circuit
52	PACK	O	CD-TEXT PACK synchronous signal
53	TSO	O	CD-TEXT data serial output
54	TSI	I	CD-TEXT control parameter serial input
55	$\overline{TSCK}$	I	CD-TEXT serial clock input
56	TSTB	I	CD-TEXT parameter strobe signal input
57	D.GND		Logic circuit GND

Pin No.	Pin Name	I/O	Function and Operation
58	TEST0	I	Test pin
59	TEST1	I	Test pin
60	ATEST	O	Test pin
61	A.GND		Analog circuit GND
62	FD	O	Focus drive output
63	TD	O	Tracking drive output
64	SD	O	Sled drive output
65	MD	O	Spindle drive output
66	DAC0	O	DAC output for adjustment
67	DAC1	O	DAC output for adjustment
68	DAC2	O	DAC output for adjustment
69	DAC3	O	DAC output for adjustment
70	A.VDD		Positive power supply terminal to analog circuit
71	EFM	O	EFM signal output
72	ASY	I	EFM comparator reference voltage input
73	C3T		3T detection capacitor additional pin
74	RFI	I	RF signal input for EFM data regulation
75	AGCO	O	RF signal output of after gain adjustment
76	AGCI	I	RF-AGC amplifier input
77	RFO	O	RF summing amplifier output
78	EQ2		RF amplifier equalizer parts additional pin
79	EQ1		RF amplifier equalizer parts additional pin
80	RF-	I	RF summing amplifier inverted input
81	A.GND		Analog circuit GND
82	A	I	Photo detector A input
83	C	I	Photo detector C input
84	B	I	Photo detector B input
85	D	I	Photo detector D input
86	F	I	Photo detector F input
87	E	I	Photo detector E input
88	A.VDD		Positive power supply terminal to analog circuit
89	REFOUT	O	Reference electric potential output
90	FE-	I	Focus error amplifier inverted input
91	FEO	O	Focus error amplifier output
92	TE-	I	Tracking error amplifier inverted input
93	TEO	O	Tracking error amplifier output
94	TE2	O	Tracking error output of after amplification
95	TEC	I	Tracking comparator input
96	A.GND		Analog circuit GND
97	PD	I	PD detection signal input for LD output monitor
98	LD	O	LD control current output
99	PN	I	APC circuit control polarity set pin
100	A.VDD		Positive power supply terminal to analog circuit

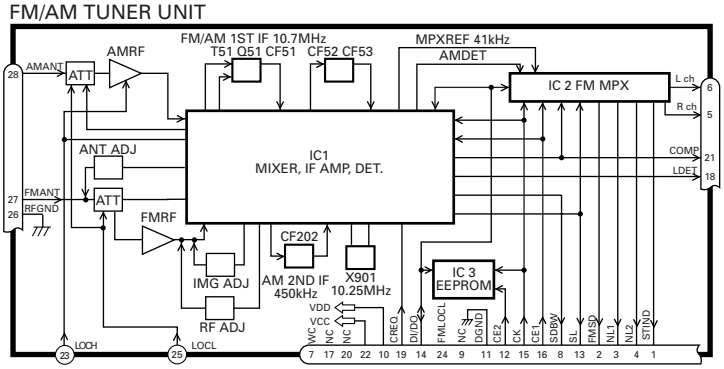
*UPD63711GC



PAL006A


TAB 1
P-GND2 2
OUT2- 3
STBY 4
OUT2+ 5
VCC 6
OUT1- 7
P-GND1 8
OUT1+ 9
SVR 10
IN1 11
IN2 12
S-GND 13
IN4 14
IN3 15
AC-GND 16
OUT3+ 17
P-GND3 18
OUT3- 19
VCC 20
OUT4+ 21
MUTE 22
OUT4- 23
P-GND4 24
SWITCH 25
Protector; Over voltage
Stand-by Circuit
sw_vcc
amp_vcc
Reference
Protector; Thermal
Offset Detection
1CM
Protector; Short circuit
Protector; Over current limit
stby
Mute circuit

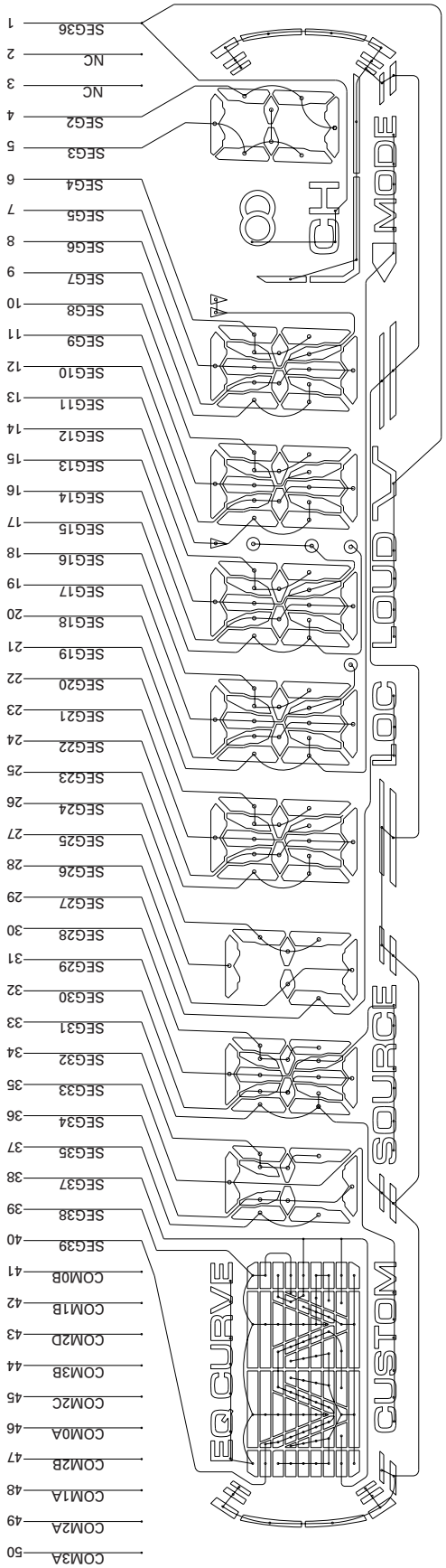
FM/AM TUNER UNIT



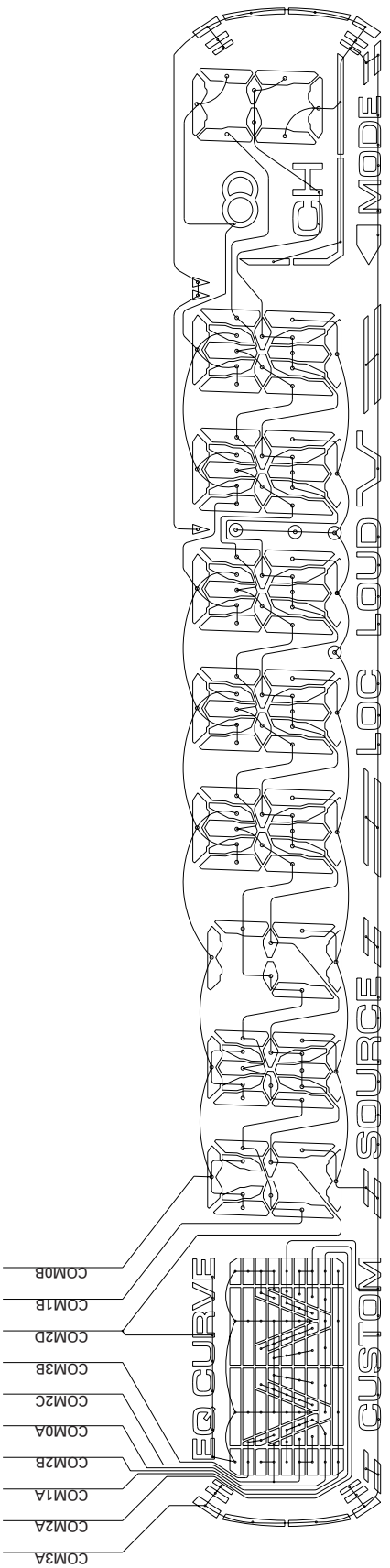
No.	Symbol	I/O	Explain	
1	STIND	O	stereo indicator	"Low" when the FM stereo signals are received. To be pulled up to the "VDD" at 47kΩ.
2	FMSD	O	FM station detector	"High" when signals are received. To be pulled up to the "VDD" at 47kΩ Meanwhile, 10kΩ should be used when taking diver FIX trigger from here and "High: 0.9VDD or more" and "Low: 250mV or less". (Should satisfy the diver IC specifications)
3	NL1	O	noise level-1	"High" when noise is received. Output for the RDS. GND at 47kΩ //1,800pF.
4	NL2	O	noise level-2	"High" when noise is received. Output for the RDS. GND at 36kΩ //330pF.
5	Rch	O	R channel output	FM stereo "R-ch" signal output or AM audio output. Add the specified di-emphasis constant.
6	Lch	O	L channel output	FM stereo "L-ch" signal output or AM audio output. Add the specified di-emphasis constant.
7	WC		write control	EEPROM write control. Writing permissible at "Low". Normally open.
8	SDBW	O	SD bandwidth	SD bandwidth signal output. For detection of detuning data for the RDS.
9	NC			Not used
10	VDD		power supply	Power supply pin for the digital section. D.C. 5V +/- 0.25V. Be careful about overlapping noise in the logic section.
11	DGND		digital ground	Grounding for the digital section.
12	CE2	I	chip enable-2	EEPROM chip enable. Active a "Low" To be pulled up to the "VDD" at 47kΩ
13	SL	I/O	signal level	Received FM/AM signal level (strength) output. Connect the specified load resistor and capacitor (10k Ω + 39k Ω //4,700pF)
14	DI/DO	I/O	data input/ data output	Data input/Data output To be pulled up to the "VDD" at 47kΩ
15	CK	I	clock	Clock input To be pulled up to the "VDD" at 47kΩ
16	CE1	I	chip enable-1	AF·RF chip enable. Active at "High" To be grounded at 47kΩ
17	NC			Not used
18	LDET	O	lock detector	Active at "Low". To be pulled up to the "VDD" at 47kΩ
19	CREQ	I	current request	Active at "Low". To be grounded at 47kΩ
20	NC			Not used
21	COMP	O	composite signal	FM composite signal output. r out < 100Ω
22	VCC		power supply	Analog section power supply pin.D.C.8.4V +/- 0.3V
23	LOCH	I	local high	FM local high pin. When seeking local high, apply 5V together with "LOCL".
24	FMLOCL	I	FM local low	FM local low pin. When seeking local low, apply 5V to the base of the NPN transistor with which the specified resistor is being connected to the emitter. Keep it open in case of ordinary marketed models.
25	LOCL	I	local low	FM/AM local low pin. When seeking local low, apply 5V to the base of the NPN transistor. Since this pin is exclusive for AM when the FMLOCL is in use, do not drive it under FM.
26	RFGND		RF ground	Grounding for the antenna section.
27	FMANT	I	FM antenna input	FM antenna input. 75Ω. Serge absorber (DSP-201M-S00B) is necessary.
28	AMANT	I	AM antenna input	AM antenna input. High impedance. Connect to the antenna through an L (LAU type) of 4.7μH.To cope with the power transmission line hums, insert a series circuit consisting of an L (a coil of about 100mH) + R (a resistor of 470 Ω to 2.2kΩ) between the GND.

7.2.2 DISPLAY

● **CAW1606(DEH-2350/X1M/ES), CAW1633(DEH-1350/X1M/ES)**

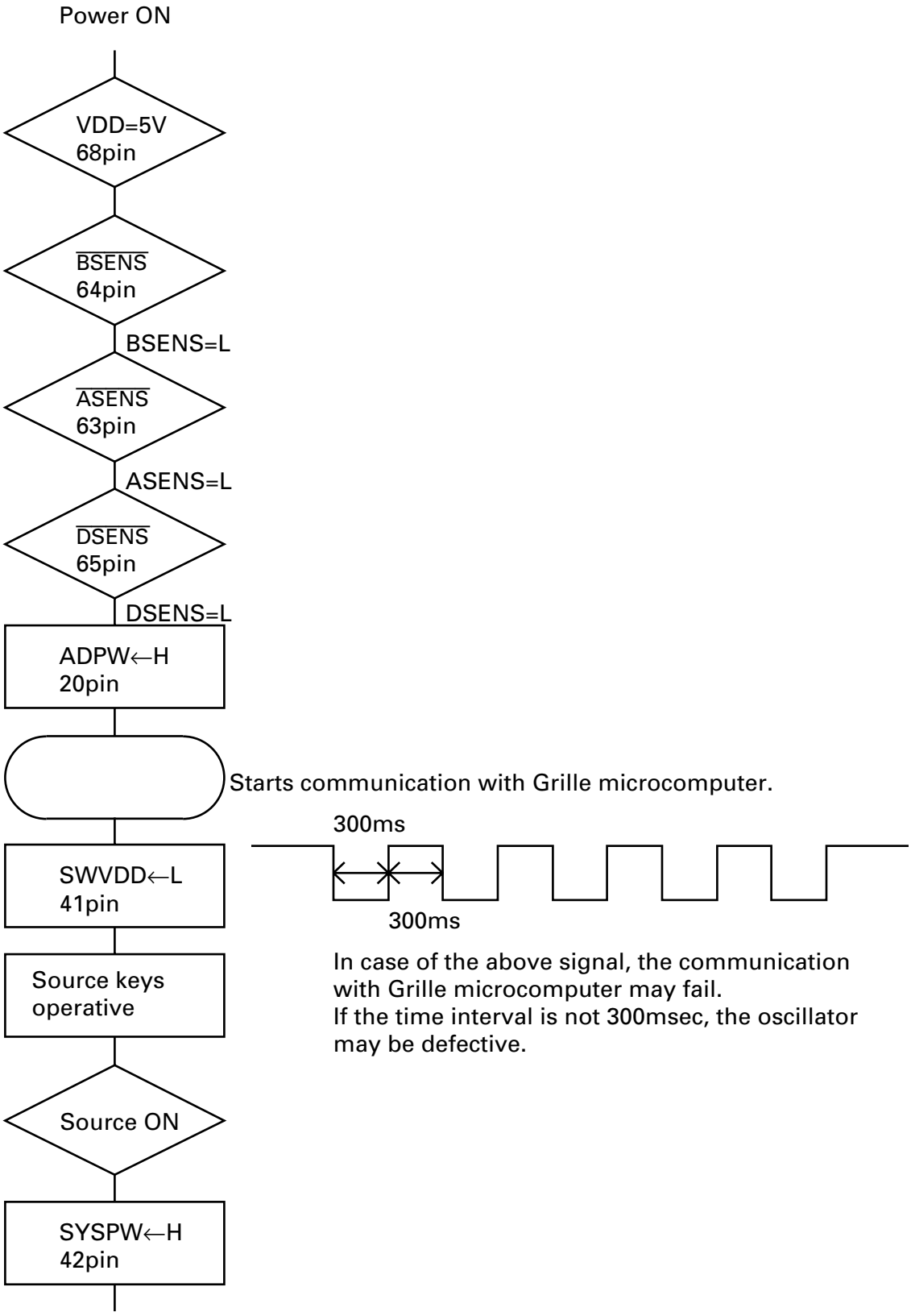


SEGMENT



COMMON

7.3 OPERATIONAL FLOW CHART



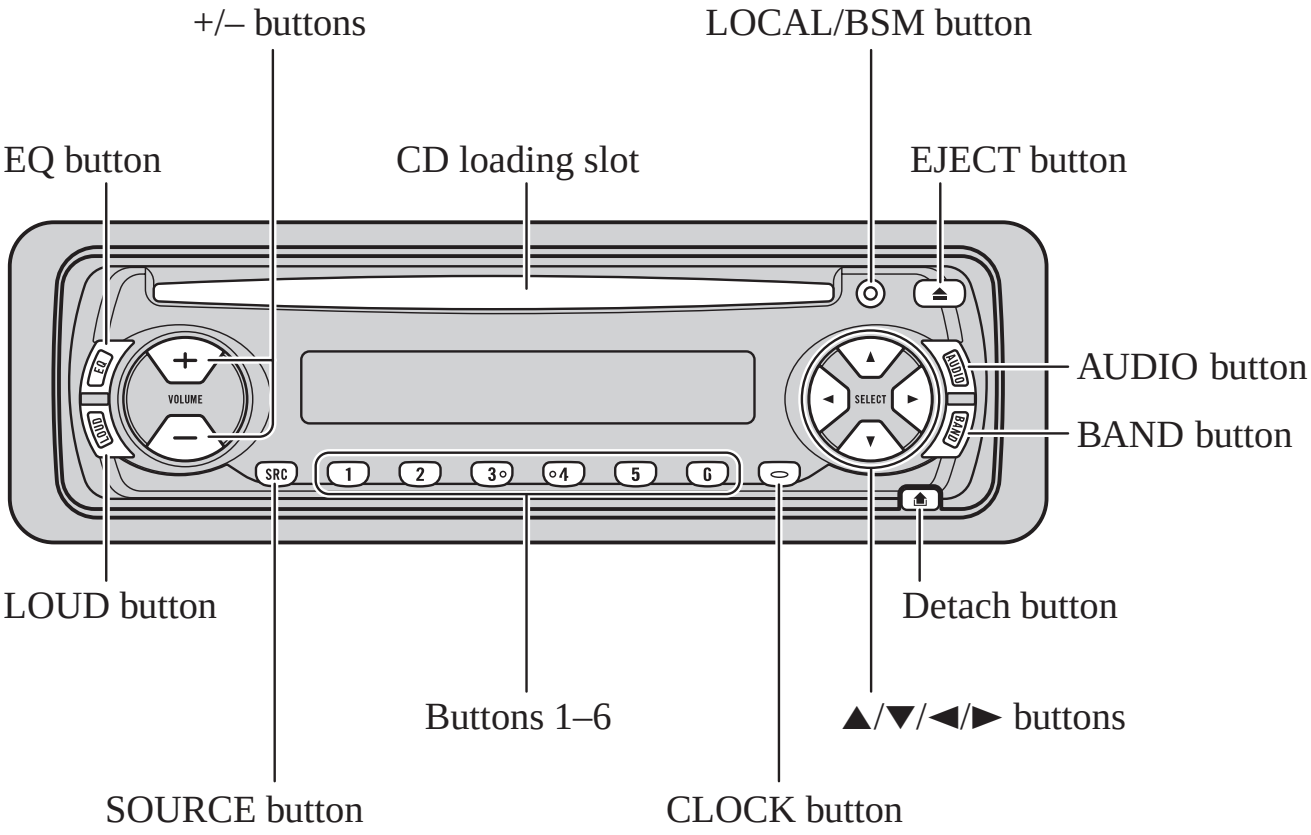
Completes power-on operation.(After that, proceed to each source operation.)

8. OPERATIONS AND SPECIFICATIONS

8.1 OPERATIONS

Key Finder

Head Unit

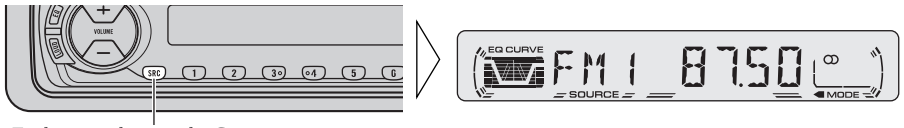


To Listen to Music

The following explains the initial operations required before you can listen to music.

Note:
- Loading a disc in this product.

1. Select the desired source (e.g. Tuner).



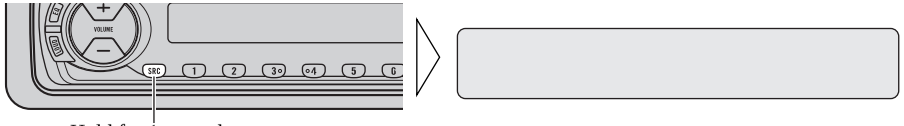
Each press changes the Source ...

Each press of the SOURCE button selects the desired source in the following order:
Built-in CD player → Tuner

Note:
- When no disc is set in this product, built-in CD player source will not change.
- When this product's blue/white lead is connected to the car's Auto-antenna relay control terminal, the car's Auto-antenna extends when this product's source is switched ON. To retract the antenna, switch the source OFF.

2. Raise or lower the volume.

3. Turn the source OFF.



Hold for 1 second

Basic Operation of Tuner

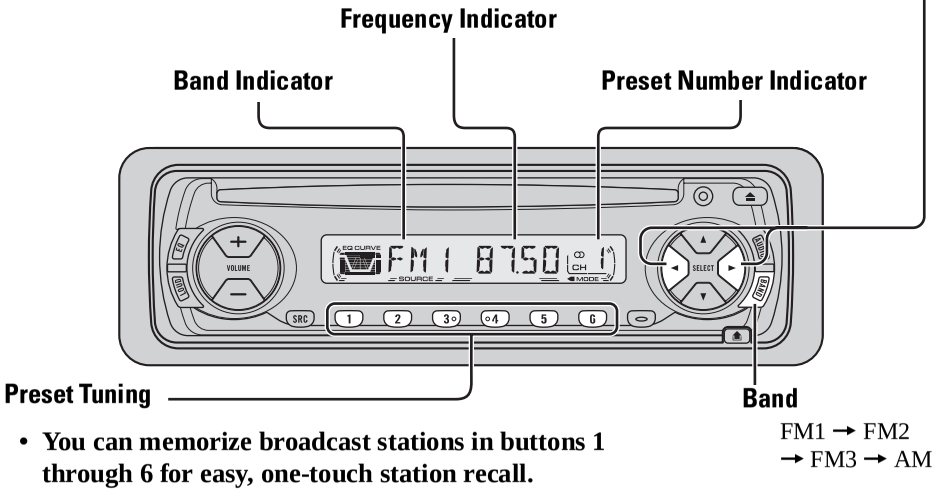
Reset the AM tuning step from 9 kHz (the factory preset step) to 10 kHz when using the tuner in North, Central or South America.

Manual and Seek Tuning

- **You can select the tuning method by changing the length of time you press the ◄/► button.**

Manual Tuning (step by step)	0.5 seconds or less
Seek Tuning	0.5 seconds or more

Note:
- If you continue pressing the button for longer than 0.5 seconds, you can skip broadcast stations. Seek Tuning starts as soon as you release the button.
- Stereo indicator "◯◯" lights when a stereo station is selected.



- **You can memorize broadcast stations in buttons 1 through 6 for easy, one-touch station recall.**

Preset station recall	2 seconds or less
Broadcast station preset memory	2 seconds or more

Note:
- Up to 18 FM stations (6 in FM1, FM2 and FM3) and 6 AM stations can be stored in memory.
- You can also use the ▲ or ▼ buttons to recall broadcast stations memorized in buttons 1 through 6.

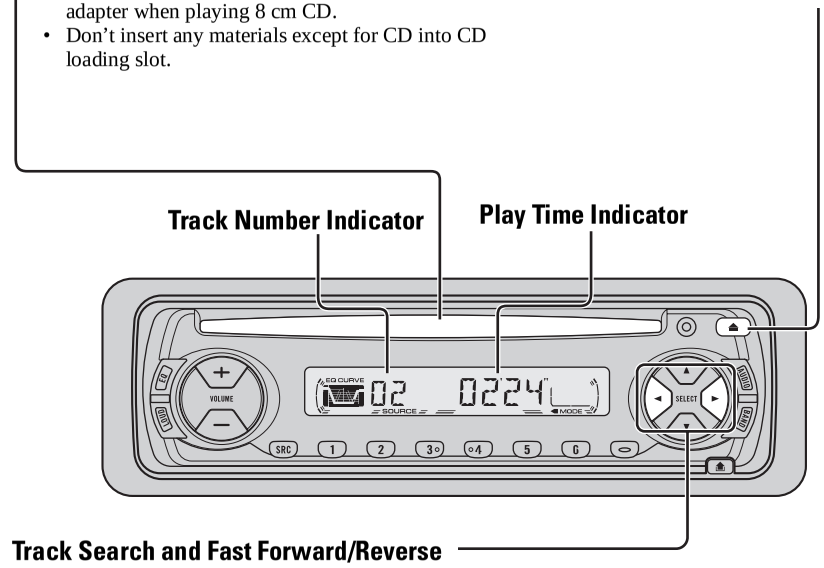
Basic Operation of Built-in CD Player

Eject

Note:
- The CD function can be turned ON/OFF with the disc remaining in this product.
- A disc left partially inserted after ejection may incur damage or fall out.

CD Loading Slot

Note:
- The built-in CD player plays one standard 12 cm or 8 cm (single) CD at a time. Do not use an adapter when playing 8 cm CD.
- Don't insert any materials except for CD into CD loading slot.

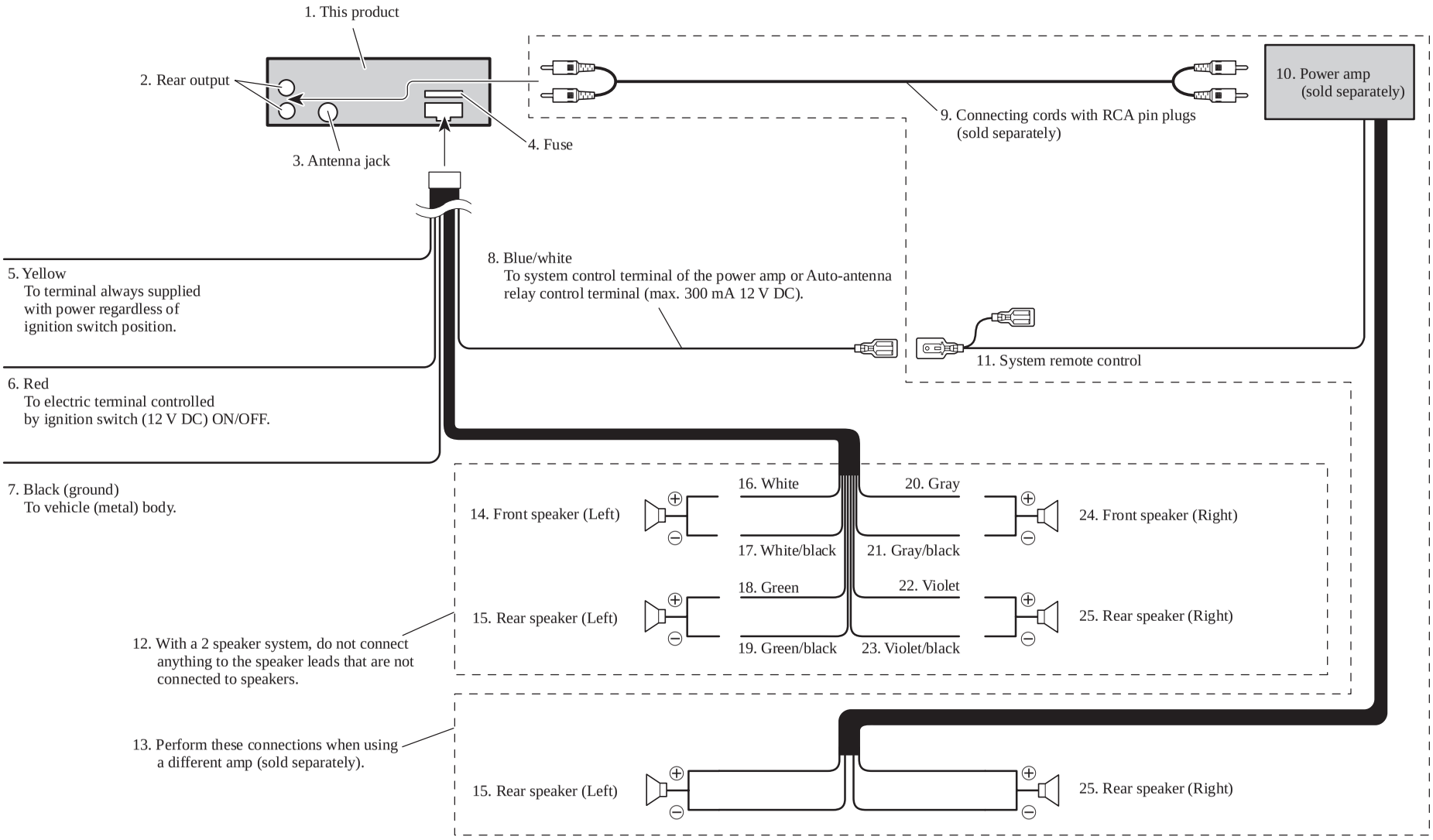


- **You can select between Track Search or Fast Forward/Reverse by pressing the ◄/► button for a different length of time.**

Track Search	0.5 seconds or less
Fast Forward/Reverse	Continue pressing

Note:
- If a disc cannot be inserted fully or playback fails, make sure the recorded side is down. Push the EJECT button and check the disc for damage before reinserting it.
- If a disc is inserted with the recorded side up, it will be ejected automatically after a few moments.
- If the built-in CD player cannot operate properly, an error message (such as "ERR-14") appears on the display. Refer to "Built-in CD Player's Error Message".

Connection Diagram



8.2 SPECIFICATIONS

General

Power source ..... 14.4 V DC (10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption ..... 10.0 A
Dimensions
(DIN) (chassis) ..... 178 (W) × 50 (H) × 159 (D) mm
(nose) ..... 188 (W) × 58 (H) × 19 (D) mm
(D) (chassis) ..... 178 (W) × 50 (H) × 164 (D) mm
(nose) ..... 170 (W) × 48 (H) × 14 (D) mm
Weight ..... 1.4 kg
Electrode dark current ..... 6mA or less

Amplifier

Continuous power output is 22 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD. (DEH-2350)

Continuous power output is 20 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD. (DEH-1350)

Maximum power output
(DEH-2350)..... 50 W × 4
(DEH-1350)..... 45 W × 4

Load impedance ..... 4 Ω (4 – 8 Ω allowable)
Preout maximum output
level/output impedance ..... 2.2 V/1 kΩ
Equalizer (3-Band Equalizer)
(Low) ..... Level: ±12 dB
(Mid) ..... Level: ±12 dB
(High) ..... Level: ±12 dB
Loudness contour
(Low) ..... +3.5 dB (100 Hz), +3 dB (10 kHz)
(Mid) ..... +10 dB (100 Hz), +6.5 dB (10 kHz)
(High) ..... +11 dB (100 Hz), +11 dB (10 kHz)
(volume: –30 dB)

CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format ..... Sampling frequency: 44.1 kHz
Number of quantization bits: 16; linear
Frequency characteristics ..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio ..... 94 dB (1 kHz) (IEC-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels ..... 2 (stereo)

FM tuner

Frequency range ..... 87.5 – 108 MHz
Usable sensitivity ..... 9 dBf
(0.8 µV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity .... 15 dBf (1.5 µV/75 Ω, mono)
Signal-to-noise ratio ..... 70 dB (IEC-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

AM tuner

Frequency range ..... 531 – 1,602 kHz (9 kHz)
530 – 1,640 kHz (10 kHz)
Usable sensitivity ..... 18 µV (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)
50 dB (±10 kHz)

Note:

- Specifications and the design are subject to possible modification without notice due to improvements.

Service Manual

ORDER NO.
CRT2423

CD MECHANISM MODULE

CX-958

- **This service manual describes the operation of the CD mechanism incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

Model No.	Order No.	CD Mechanism Module	Mechanism Unit
DEH-P410/X1N/UC DEH-P4100/X1N/UC DEH-P310/X1N/UC	CRT2414	CXK5201	CXB4800
DEH-P41/X1N/UC DEH-P3100/X1N/UC	CRT2415	CXK5201	CXB4800
DEH-P4150/X1N/ES DEH-P3150/X1N/ES	CRT2416	CXK5201	CXB4800
DEH-P4100R/X1N/EW DEH-3110/X1N/EE	CRT2417	CXK5201	CXB4800
DEH-3130R/X1N/EW DEH-3100R-B/X1N/EW DEH-3100R/X1N/EW	CRT2418	CXK5201	CXB4800

CONTENTS

PIONEER CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153-8654, Japan
PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, CA 90801-1760 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium
PIONEER ELECTRONICS ASIACENTRE PTE.LTD. 253 Alexandra Road, #04-01, Singapore 159936

K-ZZA. OCT. 1999 Printed in Japan

1. CIRCUIT DESCRIPTIONS

The LSI (UPD63711GC) used on this unit comprises six main blocks ; the pre-amp section, servo, signal processor, DAC, CD text decoder (not used on this model) and LPF. It also equips with nine automatic adjustment functions.

1.1 PRE-AMP SECTION

This section processes the pickup output signals to create the signals for the servo, demodulator and control.

The pickup output signals are I-V converted by the pre-amp with the built-in photo-detector in the pickup, then added by the RF amp to obtain RF, FE, TE, TE zero cross and other signals.

This pre-amp section is built in the servo LSI UPD63711GC (IC201). The following describes function of each section.

Since this system has a single power supply (+5V), the reference voltage for this LSI and pickup are set to REFO (2.5V). The REFO is obtained by passing the REFOUT from the LSI through the buffer amplifier. The REFO is output from Pin 89 of this LSI. All measurements are done using this REFO as reference.

Note : During the measurement, do not try to short the REFO and GND.

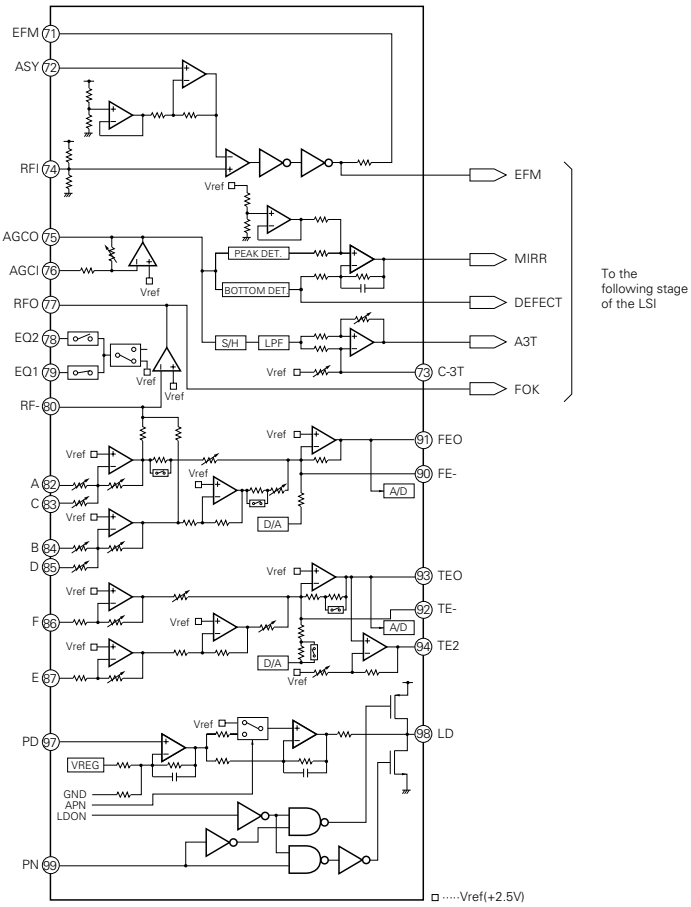


Fig.1 : BLOCK DIAGRAM OF BUILT-IN RF AMPLIFIER

1) APC Circuit (Automatic Power Control)

When the laser diode is driven with constant current, the optical output has large negative temperature characteristics. Thus, the current must be controlled from the monitor diode so that the output may be constant. APC circuit is for it. The LD current is obtained by measuring the voltage between LD1 and V+5. The value of this current is about 35mA.

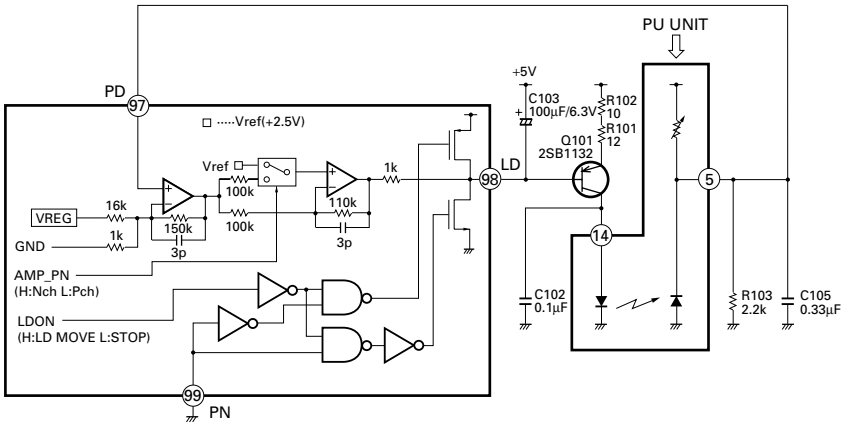


Fig.2 : APC CIRCUIT

2) RF Amplifier and RFAGC Amplifier

The photo-detector outputs (A + C) and (B + D) are added, amplified and equalized on this LSI and then output to the RFI terminal as the RF signal. (The eye pattern can be checked by this signal.)

The RFI voltage low frequency component is :

$$RFI = (A + B + C + D) \times 3.2$$

RFI is used on the FOK generator circuit and RF offset adjusting circuit.

R207 is an offset resistor for maintaining the bottom reference voltage of the RFI signal at 1.5 VDC. The D/A output used for the RF offset adjustment (to be described later) is entered via this resistor.

After the RFI signal from Pin 77 is externally AC coupled, entered to Pin 76 again, then amplified on the RFAGC amplifier to obtain the RFO signal.

The RFAGC adjustment function (to be described later) built-in the LSI is used for switching feedback gain of the RFAGC amplifier so that the RFO output may go to 1.5 ± 0.3Vpp.

The RFO signal is used for the EFM, DFCT, MIRR and RFAGC adjustment circuits.

3) RFOK Circuit

This circuit generates the signal that is used for indicating the timing of closing the focus or state of the focus close currently being played. This signal is output from Pin 4 as the FOK signal. It goes high when the focus close and in-play.

The RFOK signal is generated by holding DC level of the RFI at its peak with the succeeding digital section, then comparing it at a specific threshold level. Thus, the RFOK signal goes high even if the pit is absent. It indicates that the focus close can take place on the disc mirror surface, too.

This signal is also supplied to the micro computer via the low pass filter as the FOK signal and used for the protection and the RF amplifier gain switching.

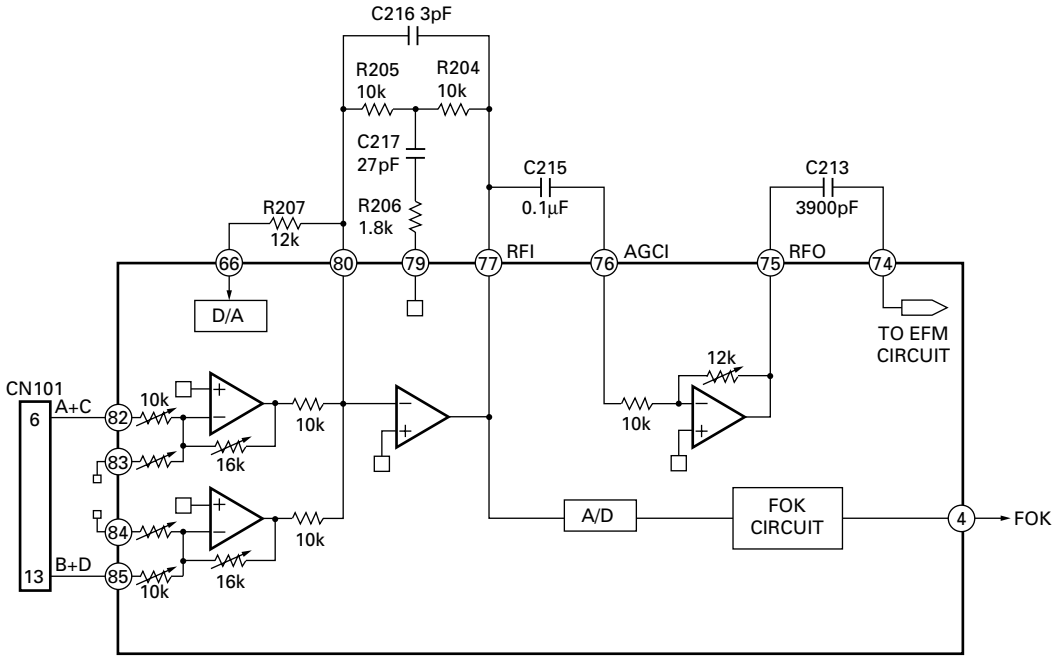


Fig.3 : RFAMP, RFAGC AND FOK CIRCUIT

4) Focus Error Amplifier

The photo-detector outputs (A + C) and (B + D) are passed through a differential amplifier and an error amplifier, and then (A + C – B – D) is output from Pin 91 as the FE signal. The FE voltage low frequency component is :

$$FE = (A + C - B - D) \times \frac{16k}{10k} \times \frac{80k}{(20k + 5k)}$$

$$= (A + C - B - D) \times 5$$

Using REFO as the reference, an S-curve of approximately 1.5 Vpp is obtained for the FE output. The final-stage amplifier cutoff frequency is 11.4 kHz.

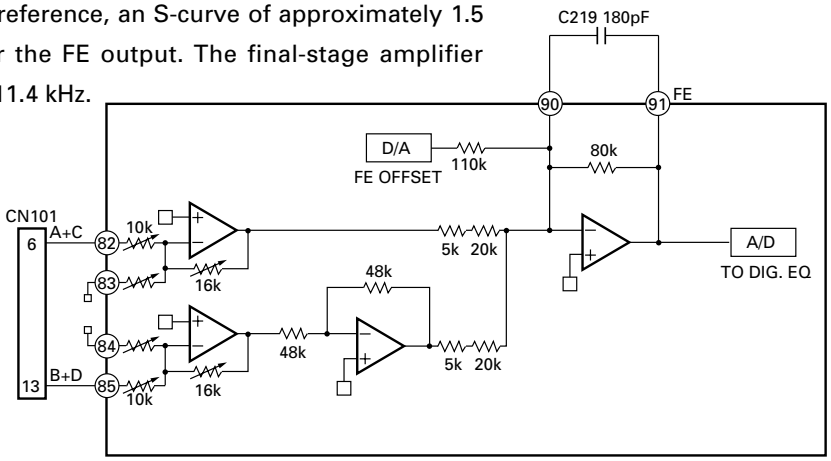


Fig.4 : FOCUS ERROR AMPLIFIER

5) Tracking Error Amplifier

The photo-detector outputs E and F are passed through a differential amplifier and an error amplifier, and then (E – F) is output from Pin 93 as the TE signal. The TE voltage low frequency component is :

$$TE = (E - F) \times \frac{224k}{112k} \times \frac{160k}{48.7k}$$

$$= (E - F) \times 6.6 \text{ (Effective LSI output is 5.0).}$$

Using REFO as the reference, the TE waveform of approximately 1.3 Vpp is obtained for the TE output. The final-stage amplifier cutoff frequency is 20 kHz.

6) Tracking Zero Crossing Amplifier

TEC signal (the tracking zero crossing signal) is obtained by multiplying the TE signal four times. It is used for locating the zero crossing points of the tracking error. The zero cross point detection is done for the following two reasons :

① To count tracks for carriage moves and track jumps.

② To detect the direction in which the lens is moving when the tracking is closed (it is used on the tracking brake circuit to be described later).

The TEC signal frequency range is 300 Hz to 20 kHz.

TEC voltage = TE level × 4

Theoretical TEC level is 5.2V. The signal exceeds D-range of the operational amplifier and thus is clipped. It, however, can be ignored since this signal is used by the servo LSI only at the zero crossing point.

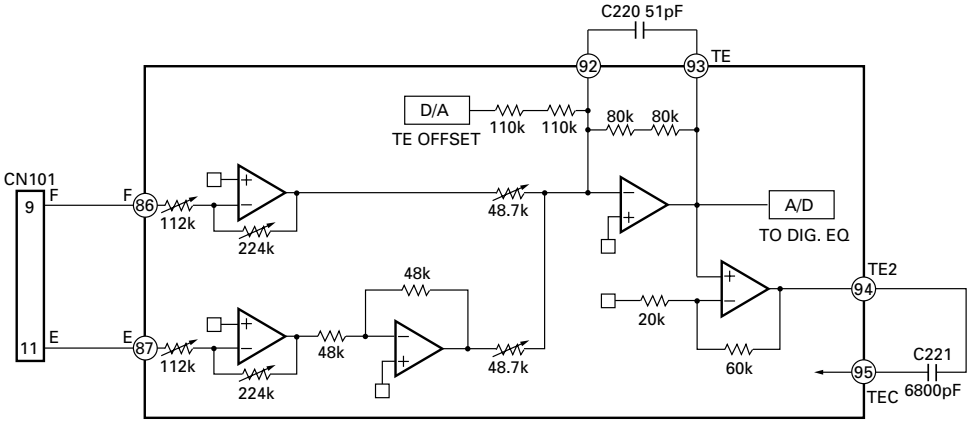


Fig.5 TRACKING ERROR AMPLIFIER AND TRACKING ZERO CROSSING AMPLIFIER

7) DFCT (Defect) Circuit

The DFCT signal is used for detecting defects on the mirrored disc surface. It allows monitoring from the HOLD pin (Pin 2). It goes high when defects are found on the mirrored surface.

The DFCT signal is generated by comparing the RF amplified signal (which is obtained by bottom holding the RFO signal) at a specific threshold level by the succeeding digital section.

Stains or scratches on the disc can constitute the defects on the mirrored disc surface. Thus, as long as the DFCT signal remains high in the LSI, the focus and tracking servo drives are held in the current state so that a better defect prevention may be ensured.

8) 3TOUT Circuit

The 3TOUT signal is generated by entering disturbance to the focus servo loop, comparing phase of fluctuations of the RF signal 3T component against that of the FE signal at that time, then converting the signal to DC level. This signal is used for adjusting bias of the FE signal (to be described later). This signal is not output from the LSI, thus its monitoring is not available.

9) MIRR (Mirror) Circuit

The MIRR signal shows the on track and off track data, and is output from Pin 3.

When the laser beam is

On track : MIRR = "L"

Off track : MIRR = "H"

This signal is used on the brake circuit (to be described later) and also as the trigger to turn on track counting when jumping take place.

The MIRR signal is supplied to the micro computer, too, for the protection purpose.

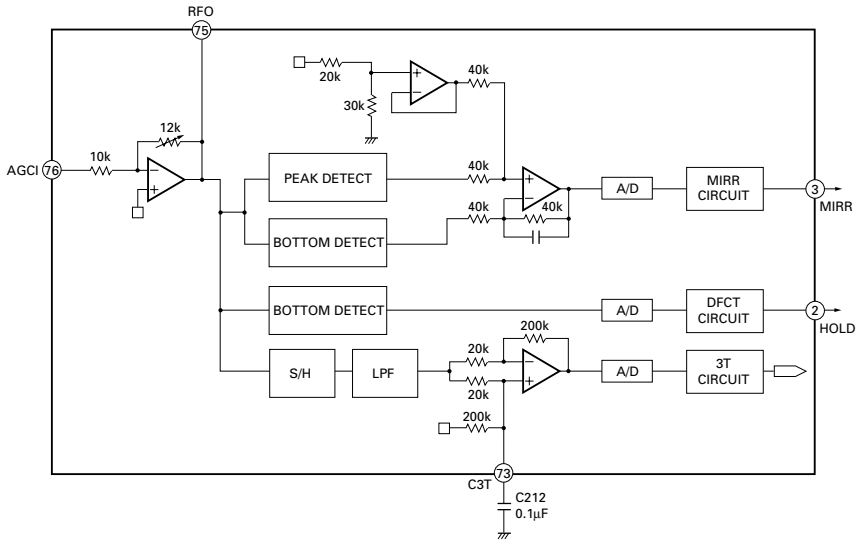


Fig.6 : DFCT, MIRR AND 3T DETECTION CIRCUIT

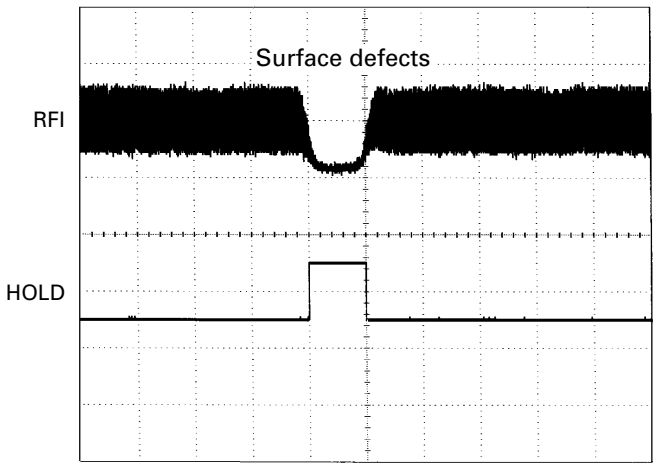


Fig.7 : HOLD OUTPUT WAVEFORM
(When surface defects are present)

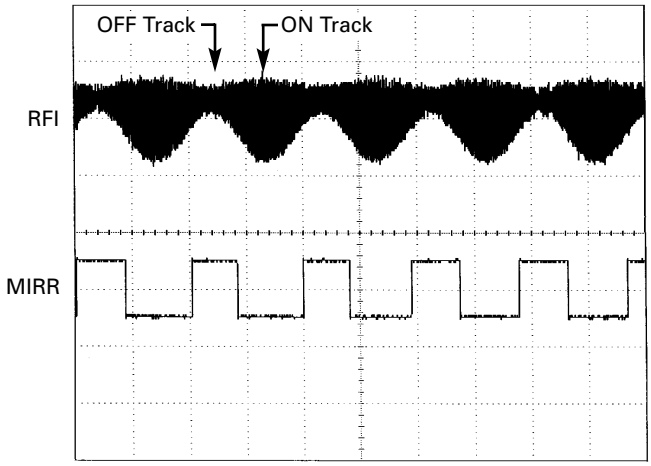


Fig.8 : MIRR OUTPUT WAVEFORM
(When an access is made)

10) EFM Circuit

This circuit is used for converting the RF signal to digital signal consisting of "0" and "1". The RFO signal from Pin 75 is externally AC coupled, entered to Pin 74, then applied to the EFM circuit.

Loss of the RF signal due to scratches or stains on the disc, or vertical asymmetry of the RF due to variations in the discs manufactured can't be eliminated by AC coupling alone. This circuit, therefore, controls the reference voltage ASY on the EFM comparator by use of the fact that "0" and "1" appear fifty fifty in the EFM signal. By this arrangement, the comparate level is constantly maintained at almost center of the RFO signal level. The reference voltage ASY is generated when the EFM comparator output is passed through the low pass filter. The EFM signal is output from Pin 71. It is a 2.5 Vp-p amplitude signal centering on REFO.

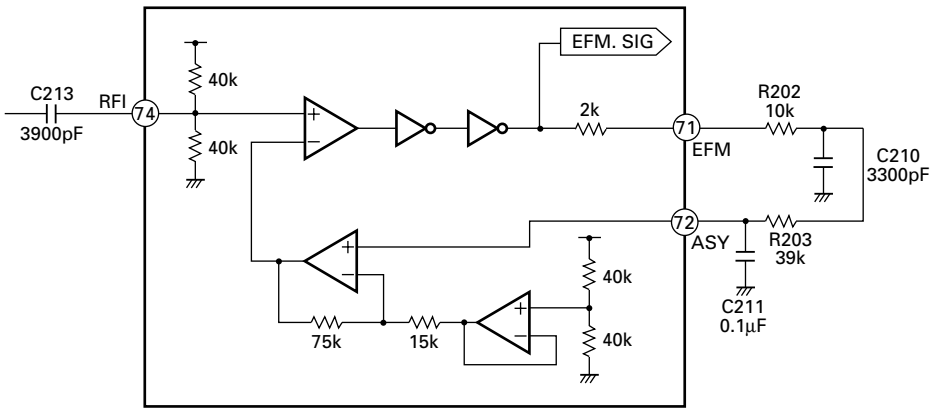


Fig.9 : EFM CIRCUIT

1.2 SERVO SECTION (UPD63711GC : IC201)

The servo section controls the operations such as error signal equalizing, in focus, track jump and carriage move. The DSP is the signal processing section used for data decoding, error correction and interpolation processing, among others.

This circuit implements analog to digital conversion of the FE and TE signals generated on the pre-amplifier, then outputs them through the servo block as the drive signal used on the focus, tracking and carriage system. The EFM signal is decoded on the signal processing section and finally output via the D/A converter as the audio signal. The decoding process also generates the spindle servo error signals which is fed to the spindle servo block to generate the spindle drive signal.

The focus, tracking, carriage and spindle drive signals are then amplified on the driver IC BA5985FM (IC301) and fed to respective actuators and motors.

1) Focus Servo System

The focus servo main equalizer is consisted of the digital equalizer. Fig.10 shows the focus servo block diagram.

When implementing the focus close on the focus servo system, the lens must be brought within the in-focus range. Therefore, the lens is moved up and down according to the triangular focus search voltage to find the focus point. During this time, the spindle motor is kicked and kept rotating as a set speed.

The servo LSI monitors the FE and RFOK signals and automatically carries out the focus close at an appropriate point.

The focus closing is carried out when the following three conditions are met :

① The lens approaches the disc from its current position.

② RFOK = "H"

③ The FZC signal is latched at high after it has once crossed the threshold set on the FZD register (Edge of the FZD).

As the result, the FE (= REFO) is forced to low.

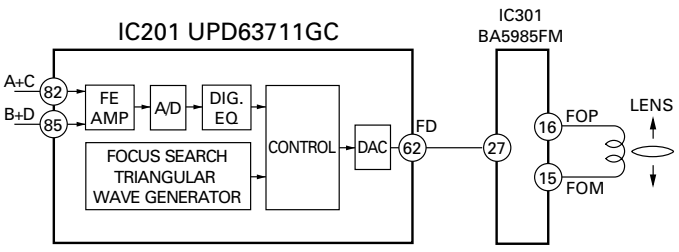


Fig.10 : FOCUS SERVO BLOCK DIAGRAM

When the above conditions are all met and the focus is closed, the XSI pin goes to low from the current high, then 40 ms later, the microcomputer begins to monitor the RFOK signal after it that has been passed through the low pass filter.

When the RFOK signal is recognized as low, the micro computer carries out various actions including protection.

Fig.11 a series of operations carried out relevant to the focus close (the figure shows the case where focus close is not available).

You can check the S-curve, search voltage and actual lens behavior by selecting the Display 01 for the focus mode select in the test mode, and then pressing the focus close button.

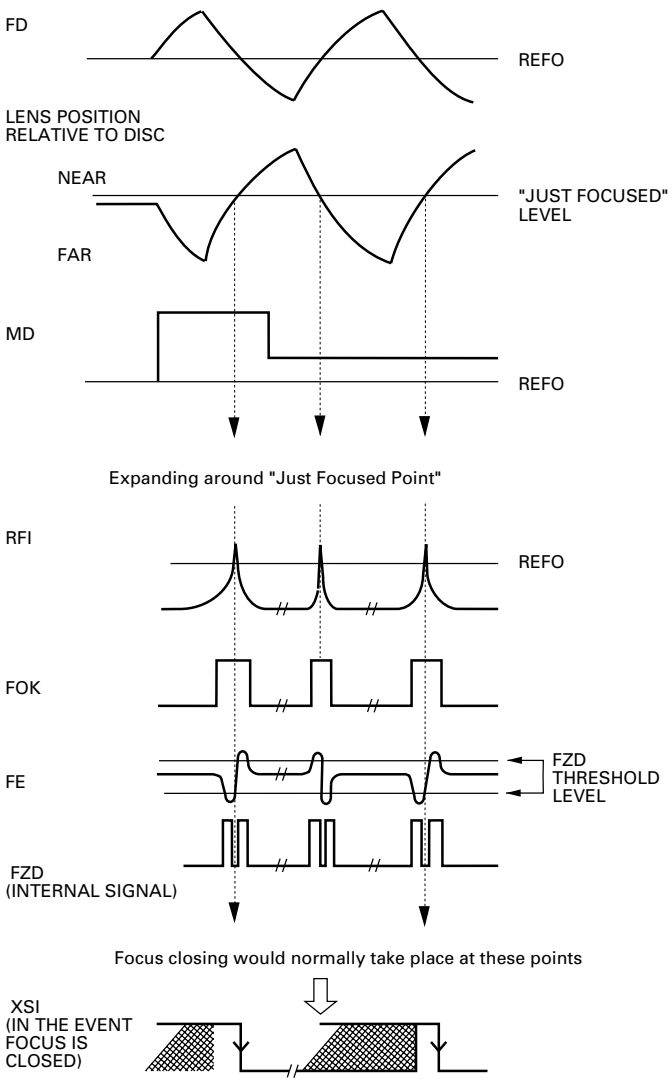


Fig.11 : FOCUS CLOSE SEQUENCE

2) Tracking Servo System

The digital equalizer is employed for the main equalizer on the tracking servo. Fig.12 shows the tracking servo block diagram.

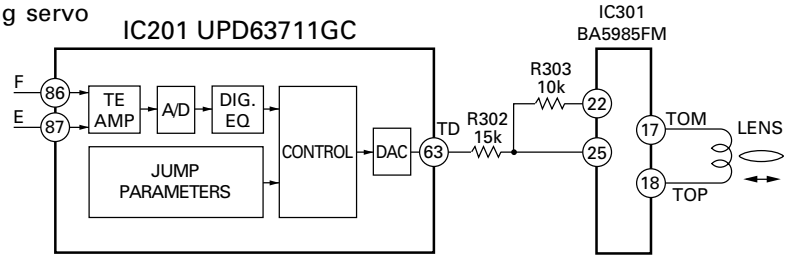


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

a) Track jump

When the LSI receives the track jump command from the microcomputer, the operation is carried out automatically by the auto sequence function of the LSI. This system has five types of track jumps used for the search : 1, 4, 10, 32 and 32 × 3. In the test mode, in addition to three jumps (1, 32 and 32 × 3), move of the carriage can be check by mode selection. For track jumps, the microcomputer sets almost half of tracks (5 tracks for 10 tracks, for instance) and counts the set number of tracks using the TEC signals. When the microcomputer has counted the set number of tracks, it outputs the brake pulse for a fixed period of time (duration can be specified with the command) to stop the lens. In this way, the tracking is closed and normal play is continued.

To improve the servo loop retracting performance just after the track jump, the brake circuit is turned on for 50 ms after the brake pulse has been terminated to increase gain of the tracking servo.

Fast forward and reverse operations are realized by through consecutive signal track jumps. The speed is about 10 times as fast as that in the normal mode.

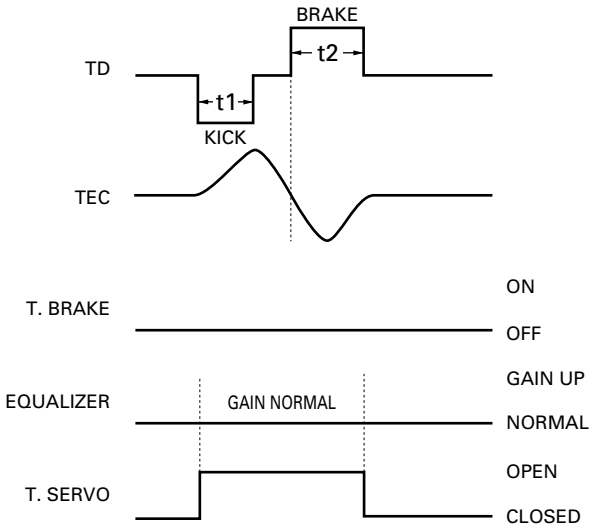


Fig.13 : SINGLE TRACK JUMP

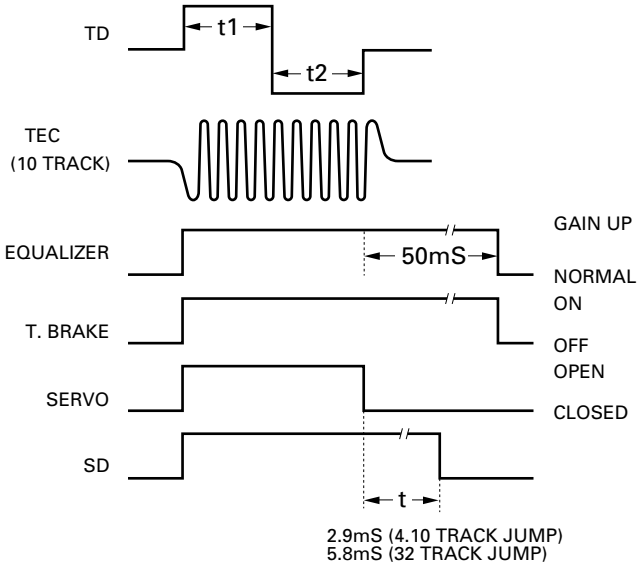
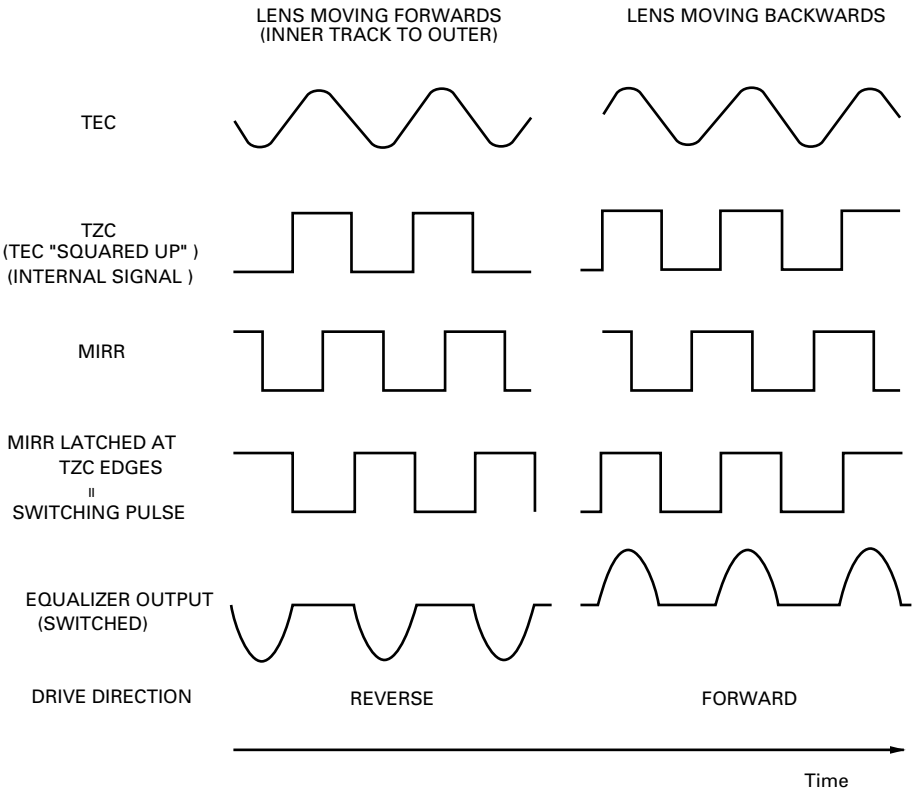


Fig.14 : MULTI-TRACK JUMP

b) Brake Circuit

The servo retracting performance can be deteriorate during the setup or track jump operation. In this connection, the brake circuit is used to ensure steady retract of the tracking servo. The brake circuit detects in which direction the lens is moving, then slows down its move by outputting the drive signal that moves the lens into the opposite direction alone. Track slippage direction is determined by referencing the TEC and MIRR signals and their phase.



Note : Equalizer output assumed to hava same phase as TEC.

Fig.15 : TRACKING BRAKE CIRCUIT

3) Carriage Servo System

The carriage servo supplies the tracking equalizer's low-frequency component (lens position data) output to the carriage equalizer, then, after providing a fixed amount of gain to it, outputs the drive signal from the LSI. This signal is then applied to the carriage motor via the driver IC.

When the lens offset reaches a certain level during play, the entire pickup must be moved into the forward direction. Therefore, the equalizer gain is set to the level that allows to generate a voltage higher than the carriage motor starting voltage. In actual operations, a certain threshold level is set for the equalizer output by the servo LSI so that the drive voltage may be output from the servo LSI only when the equalizer output exceeds the threshold level. This arrangement helps reducing power consumption. Also, due to disc eccentricity or other factors, the equalizer output may cross the threshold level a number of times. In this case, the drive voltage output from the LSI will have pulse-like waveform.

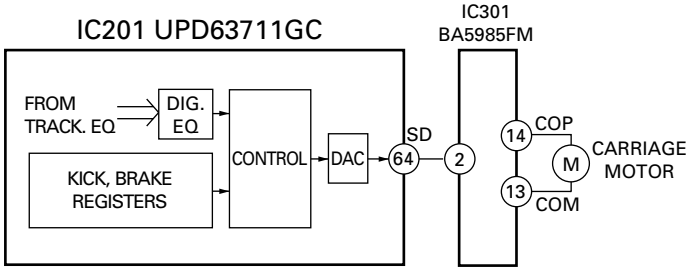


Fig.16 : CARRIAGE SERVO BLOCK DIAGRAM

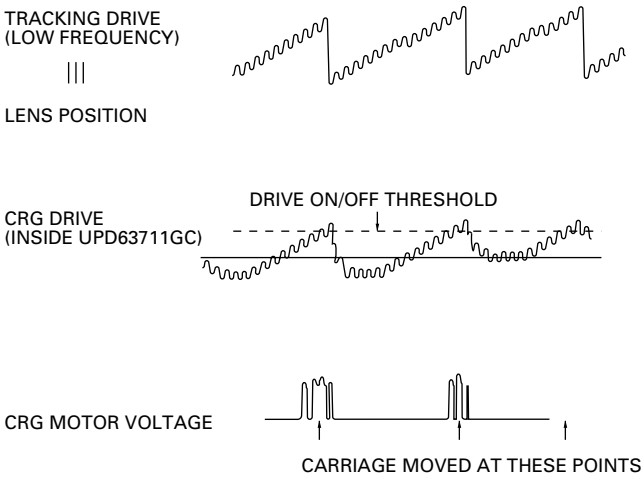


Fig.17 : CARRIAGE SIGNAL WAVEFORM

4) Spindle Servo System

The spindle servo has the following modes.

① Kick :

This mode is used for accelerating the disc rotation during setup.

② Offset :

(a) After the kick is over in the setup, this mode is turned on until changing to rough servo mode.

(b) When focus is lost during play, this mode is turned on until the focus is restored.

Both of the above are used for maintaining the disc rotation rate near to the specified rate.

③ Applicable servo :

The CLV servo mode is turned on for the normal operations.

In the EFM demodulation block, the frame sync signal and internal counter output signal are sampled for every WFCK/16 and a signal is produced for indicating whether or not they are matching.

They are determined to be asynchronous only when this signal fails to match 8 times in succession. In all other cases, above two signals are assumed to be synchronous. In the applicable servo mode, the retracting servo is automatically selected if the two signals are synchronous. If not, the regular servo is automatically selected.

④ Brake :

This mode is turned on when stopping the spindle motor.

The microcomputer outputs the brake voltage through the servo LSI. The LSI monitors the EFM waveform and, if its longest pattern exceeds a certain interval (if the rotation is sufficiently slow), the flag is set the LSI and the microcomputer turns off the brake voltage. When the flag is not up within a specified period time, the microcomputer switches the mode from the brake to the stop mode, and maintains this mode for a fixed period of time. If this stop mode is continued for a fixed period of time, the disc will be ejected.

⑤ Stop :

This mode is used for powering on the system and the eject operation. When this mode is turned on, voltage across the spindle motor is 0V.

⑥ Rough servo :

This mode is used for when the carriage feed (carriage mode for the long search, etc.) is turned on. The linear speed is calculated from the EFM waveform and high or low level is entered to the spindle equalizer. In the test mode, this mode is also used for the grating check.

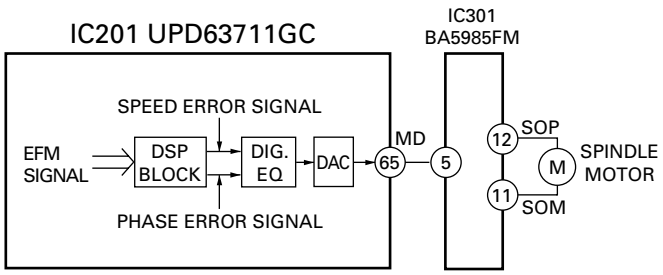


Fig.18 : SPINDLE SERVO MOTOR BLOCK DIAGRAM

1.3 AUTOMATIC ADJUSTMENT FUNCTIONS

Every circuit adjustment on the CD-LSI of this system is automated.
Every circuit adjustment is automatically implemented when the disc is inserted or the CD mode is selected from the source key. The following describes how the adjustments are executed.

1) FZD Cancel Setting

This setting is used for executing the focus close operation without fail.
When power is turned on, the FE offset level is read and a voltage opposite to this offset value is written to the CRAM on the IC to cancel the offset. In this manner, the FZD threshold level can be set to a constant value (+240mV), thereby ensuring to meet one of the requirements for the IC to execute the focus close that "the FZD signal is latched at high".

2) Automatic Adjustment of TE, FE and RF Offset

Using REFO as the reference, this function adjusts the pre-amp TE, FE and RF offsets to the respective target value when power is turned on (targets values of the TE, FE and RF are 0, 0 and –1V, respectively).
The following is the adjustment procedure :

(1) Respective offset (LD off) is read by the microcomputer via the servo LSI.
(2) The microcomputer calculates the voltages to be corrected from the read values, then sets them to the specified field.

3) Automatic Adjustment of Tracking Balance (T. BAL)

This adjustment is used for eliminating differences between the pickup E and F channels outputs by adjusting gain of the amplifier on the LSI. In the actual operation, the TE waveform is adjusted so that it may be vertically symmetric with REFO.
The following is the adjustment procedure :

(1) Make sure the focus close is complete.
(2) Kick the lens in the radial direction to generate the TE waveform.
(3) At this time, the microcomputer reads the TE signal offset value (via the servo LSI) being calculated by the LSI.
(4) The microcomputer determines if the read offset value is positive, negative or zero.
If the offset value = 0, the adjustment is terminated.
If the offset value = A positive or negative value, gain of the E and F channels amplifiers are modified according the predetermined rule.

Then above steps (2) through (4) are repeated until the "Offset value = 0" or "Specified limit count" is reached.

4) Automatic Adjustment of FE Bias

This adjustment is intended at maximizing the RFI level by optimizing the focus point in-play. This adjustment utilizes the phase difference between the RF waveform 3T level and the focus error signal when disturbance is applied.
Since disturbance is applied to the focus loop, this adjustment is designed to take place in the same timing as the auto gain control (to be described later).
The following is the adjustment procedure :

(1) Disturbance is injected to the focus loop by the command from the microcomputer (within the servo LSI).
(2) The LSI detects fluctuation of the RF signal 3T component level.
(3) The LSI determines relationship between fluctuation of the 3T component and the injected disturbance to detect magnitude and direction of the off-focus introduced.
(4) The microcomputer reads the detected results from the LSI.
(5) The microcomputer calculates necessary correction, then hands the calculated value to the bias adjustment term set on the LSI.

This adjustment is repeated several times, as it is so with the auto gain control, to ensure higher accuracy.

5) Focus and Tracking Automatic Gain Control

This function is used for implementing automatic control of the focus and tracking loop gain.

The following is the adjustment procedure :

(1) Inject disturbance to the servo loop.

(2) Extract the error signal (FE and TE) generated at when the disturbance is applied to obtain the signals G1 and G2 via the B.P.F.

(3) The microcomputer reads the G1 and G2 signals via the LSI.

(4) Based on the necessary correction calculated by the microcomputer, the LSI performs the loop gain adjustment.

Above adjustments are repeated several times to ensure higher adjustment accuracy.

6) Automatic RF Level Adjustment (RFAGC)

This adjustment is used for implementing intended signal transmission successfully by adjusting unevenness of the RF signal (RFO) levels, that results from disc and machine relevant factors, to a target value. The adjustment is actually done by varying gain of the amplifier provided between the RFI and RFO.

The following is the adjustment procedure :

(1) Using the command, the microcomputer reads the output from the RF level detection circuit on the servo LSI.

(2) Based on the read value, the microcomputer calculates an amplifier gain that will produce the target RFO level.

(3) The microcomputer sends the corresponding command to the servo LSI so that the above gain value may be set.

This adjustment takes place at the following timing :

- When the focus close alone is completed during the setup process.
- Just before the setup is completed (just before the play takes place).
- After the off-focus has been corrected during the play.

7) Adjustment of Pre-Amp Stage Gain

It is used for adjusting the entire RFAMP (FE, TE and RF amplifiers) to +6dB or +12dB depending on given gain level when reflected light from the disc is significantly below the required level due to stained lens. This phenomena can be noticed when playing back the CD-RW.

The following is the adjustment procedure :

When reflected light from disc is judged to be significantly below the required level during the setup, set the entire RFAMP to +6dB or +12dB. In this case, if the gain is modified, the setup have to be repeated from the first step.

Through the adjustment, if you judged the play becomes available by setting the entire RFAMP to +6dB, +6dB should be selected for the setup next time on.

See the figure below :

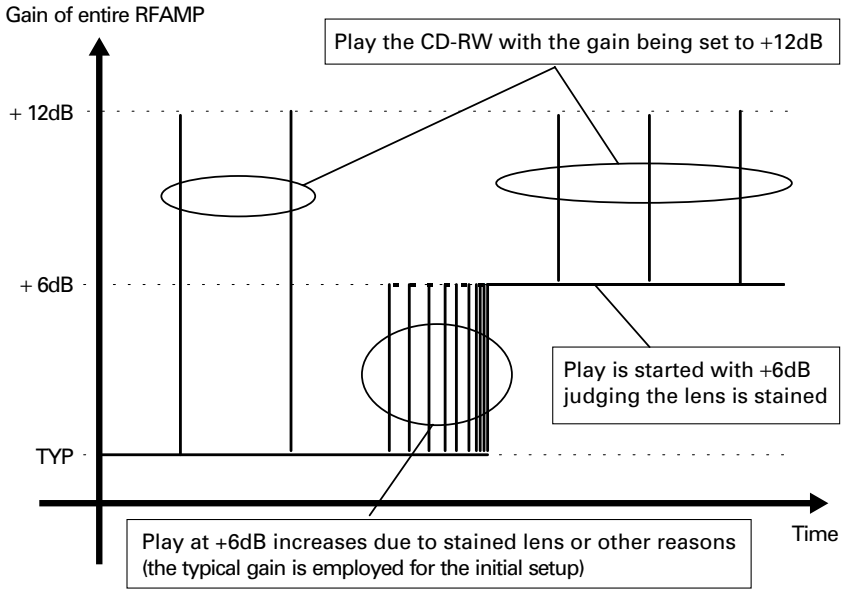


Fig.19 : CONCEPTUAL DIAGRAM OF PRE-AMP GAIN ADJUSTMENT

8) Initial Adjusting Values

All the automatic adjustments are implemented using the previous adjustment values as the initial values unless the microcomputer power (the backup power) is not turned off (though there are some exceptions).
When the backup is turned off, automatic adjustment is executed based on the initial values rather than the previous adjustment values.

9) Displaying Coefficients After Adjustment

You can display and check results of some automatic adjustments (FE and RF offset, FZD cancel and F / T / RFAGC) from the test mode. The following coefficients are displayed in each automatic adjustment :

(1) FE and RF offset and FZD cancel

Reference value = 32 (The coefficient of 32 indicates that no adjustment was required).

The results are displayed in multiples of approximately 40 mV.

An example : When FZD cancel coefficient = 35

35 – 32 = 3

3 × 40 mV = 120 mV

Since the corrected value is approximately +120 mV, the FE offset before adjustment was –120 mV.

(2) F and T gain adjustment

Reference value = Focus/Tracking = 20

A coefficient displayed indicates an amount of adjustment conducted on the reference value.

An example : When AGC coefficient = 40

40/20 = Overall gain has bee doubled (+6dB). (The original loop gain of 1/2 has been doubled to have the targeted overall gain.)

(3) RF level adjustment (RFAGC)

Reference value = 8

Coefficient = 9 to 15 ····· The direction in which the RF level is increased (the gain is increased).

Coefficient = 7 to 0 ····· The direction in which the RF level is decreased (the gain is decreased).

Incrementing or decreasing the coefficient by "1" varies the gain by 0.7 to 1dB.

Maximum gain = Typically +6.5dB. Coefficient at this time is 15.

Minimum gain = Typically –6.0dB. Coefficient at this time is 0.

1.4 POWER SUPPLY AND LOADING SECTION

The power supply of the system uses VD (8.3V) from the mother board. VD is fed to 5 channel CD driver IC, 5V Reg IC and disc detection LED.

The microcomputer turns on or off the CD driver and the 5V using "CONT" and "CD5VON", respectively. The loading drive is turned on or off by the input signals "CDEJET" and "CDLOAD". No control terminal is provided for turning the loading drive on or off.

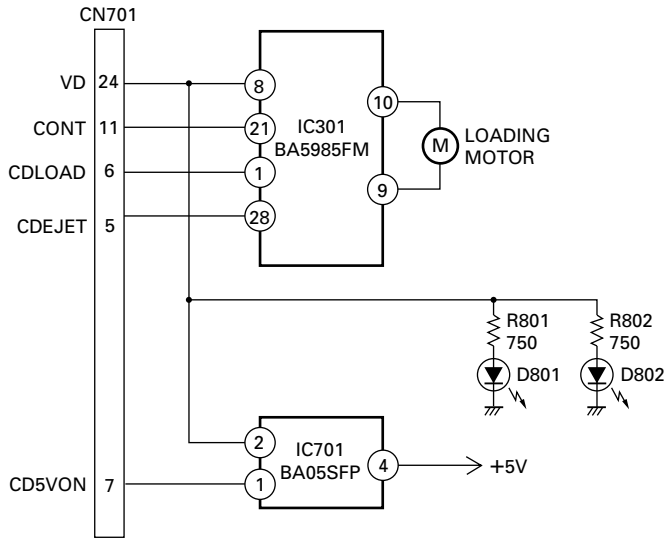
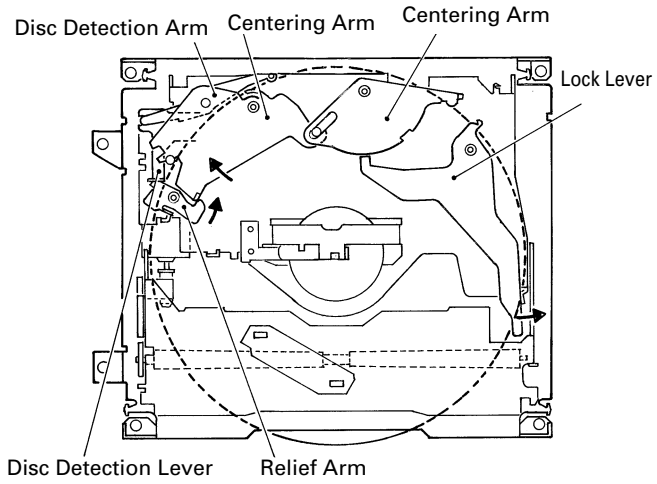


Fig.20 : POWER SUPPLY AND LOADING SECTION

2. MECHANISM DESCRIPTIONS

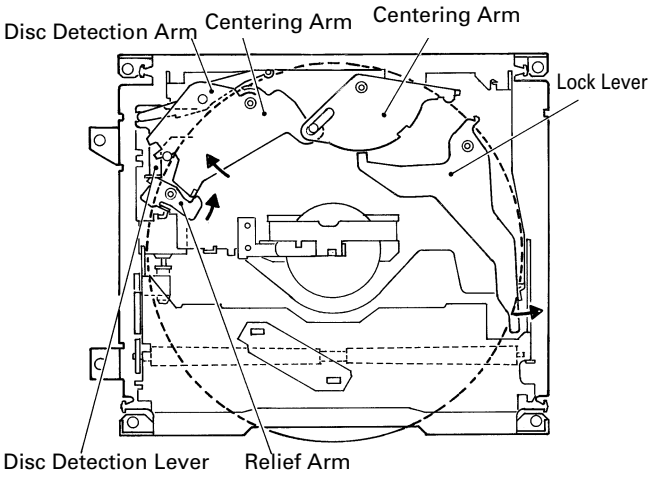
● Loading Operation (when a 12 cm disc is used)

1. Insert a 12 cm disc (the sensor turns on the motor revolution).
2. The disc pushes the Lock Lever in, thereby resetting the lock currently applied to the Centering Arms.
3. The disc further pushes the Centering Arms in.
4. The right side and left side arms are engaged to perform centering of the disc.
5. The disc pushes the Disc Detection Arm in, thereby pushing the Disc Detection Lever forward.
6. Clamping action retracts the Disc Detection Lever toward forward side, thereby rotating the Relief Arm.
7. The Relief Arm further pushes the Centering Arm in, thus detaching it from the disc.



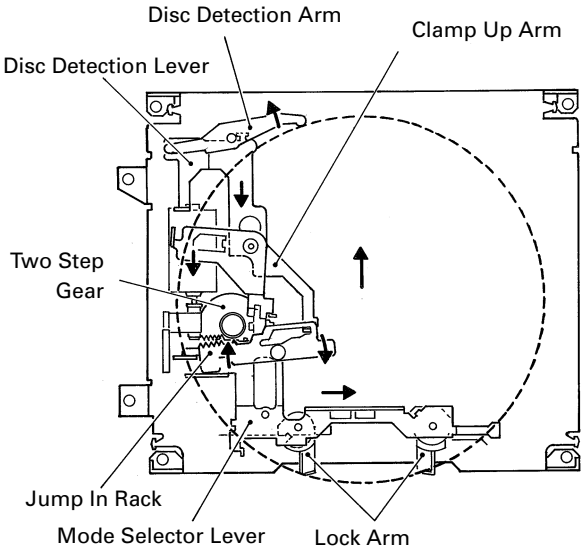
● Loading Operation (when a 8 cm disc is used)

1. Insert an 8 cm disc (the sensor turns on the motor revolution).
2. The disc does not contact against the Lock Lever, thus centering of the disc is performed by the Centering Arm being locked.
3. When the right side slot is used, the lock currently applied to the Centering Arm remains turned on even if the disc may touch the Lock Lever because the disc leaves the lever before it reaches the Centering Arm.
4. Succeeding procedures are the same as that for 12 cm discs.



● Clamping Operation

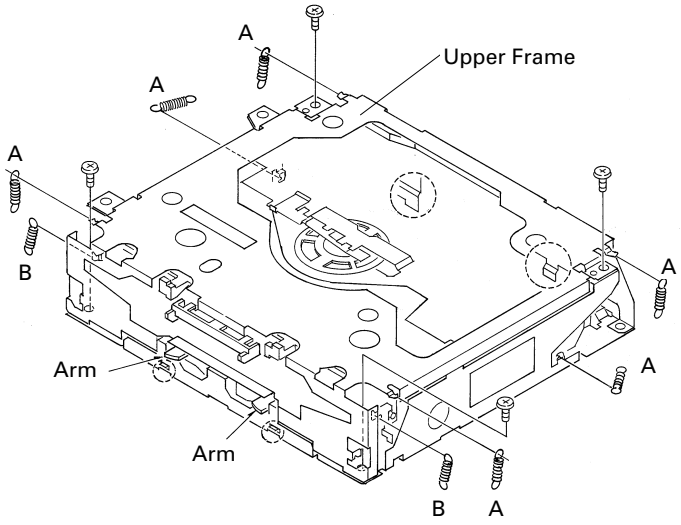
1. Insert a disc.
2. The Detection Arm pushed forward by the Detection Lever turns on rotation of the Jump In Rack.
3. The Jump In Rack then engages with the Two Step Gear and moves toward right.
4. At the same time, the Mode Selector Lever connected to the Jump In Rack starts moving toward right, thereby rotating the Lock Arm and resetting the mechanical lock. The Clamp Up Arm too is rotated by the above action and, thus, the Clamp Up Arm now being lifted by shape of the cam of the Clamp Arm is lowered.
   And, the Guide Arm is also moved down because of shape of the cam of the Mode Selector Lever.
5. By use of the cam shape, the Jump In Rack being moved toward right retracts the Disc Detection Lever in forward direction, thereby turning on rotation of the Relief Arm.



3. DISASSEMBLY

● Removing the Upper Frame

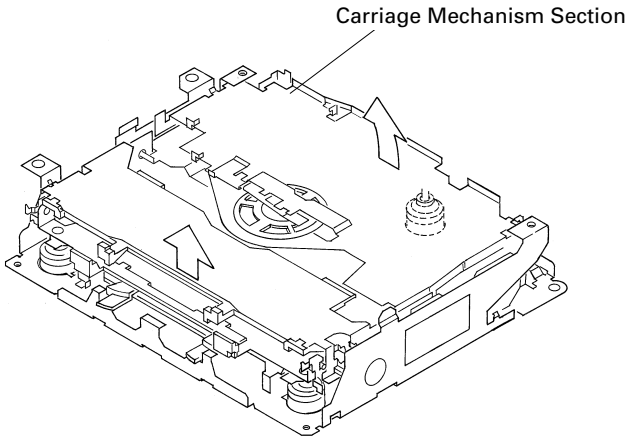
1. Remove six Springs A, two Springs B and four Screws.
2. Remove two Tabs situated on rear side of the Upper Frame, remove two Arms on the front side, then remove two Tabs on the front side.



● Removing the Carriage Mechanism

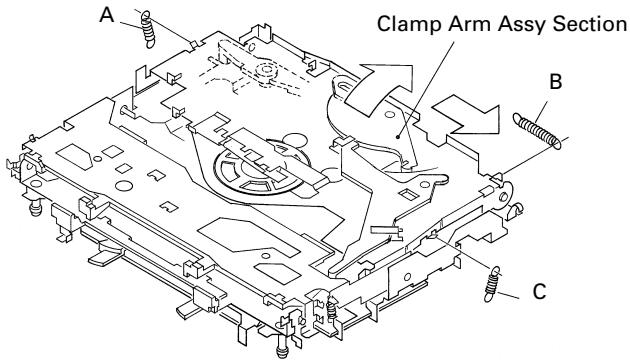
1. Disengage the Carriage Mechanism from the two dampers situated in the front side by driving it up, then disengage and remove the mechanism from the two dampers by driving it up aslant into front side direction.

Note : When assembling the Carriage Mechanism, coat the dampers with alcohol prior to the assembly.



● Removing the Clamp Arm Assy

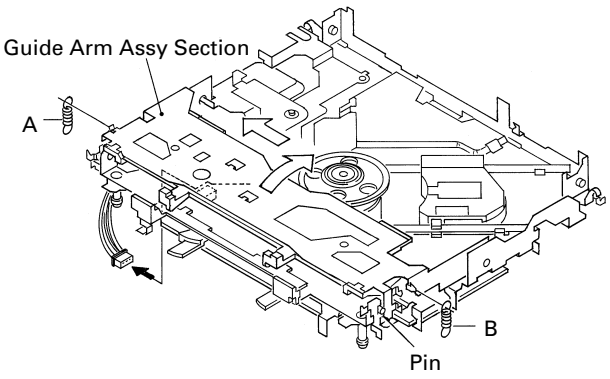
1. Remove a Spring A, a B and a Spring C.
2. Drive the Clamp Arm Assy up into rear side direction, then disengage the arm from its current position Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward right side to remove it.



● Removing the Guide Arm Assy

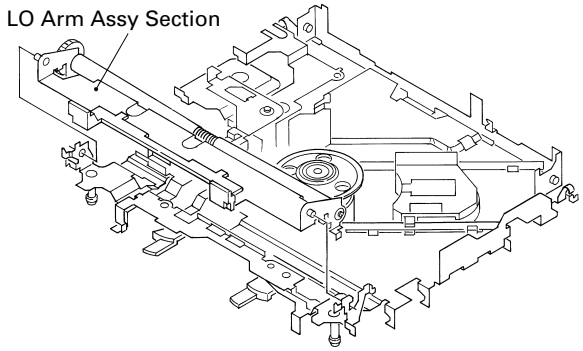
1. Remove a connector, a spring A and B
2. Drive the Guide Arm Assy up aslant into rear side direction, then remove it from a Pin. Finally, drive the assembly approximately 45 degrees upward, then slide the assembly toward left side to remove it.

Note : When assembling the guide arm assembly, route the cord inside the assembly. In this operation, care must be exercised so that cord may be caught by the gear.



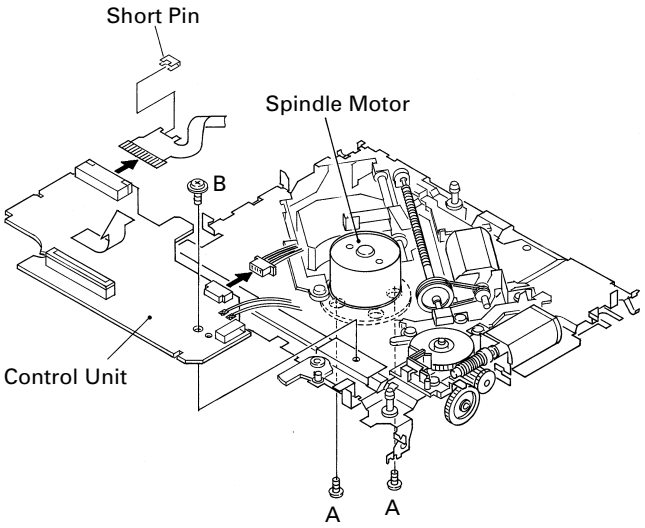
● Removing the LO Arm Assy

1. Remove two Pins to dismount the LO Arm Assy.



● Removing the Control Unit and the Spindle Motor

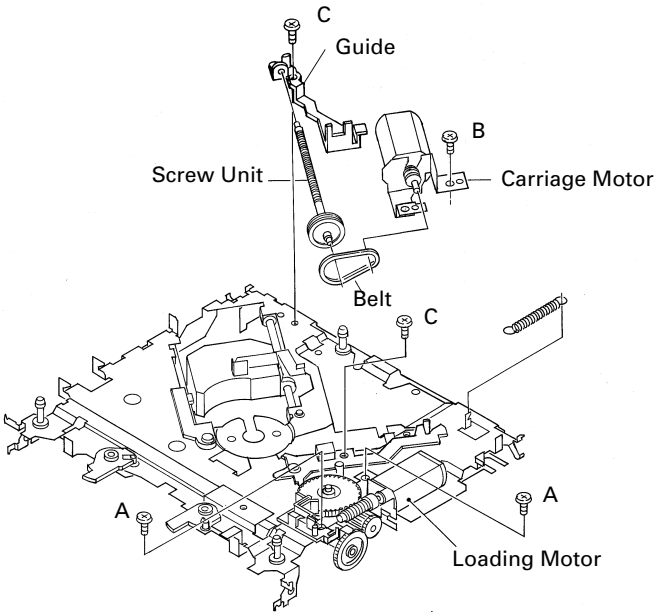
1. Remove from the connector after mounting the short pin on the flexible PCB of the pickup unit.
2. Remove two Soldered joints, then remove two Screws A.
3. Remove two connectors and a Screw B.
4. Disengage the Control Unit from two Tabs, then dismount the unit by sliding it toward left.
5. Dismount the Spindle Motor.



● Removing the Loading Motor and Carriage Motor

1. Remove the Spring and two Screws A.
2. Dismount the Loading Motor.
3. Remove the Belt, a Screw B, two Screws C, a Guide and a Screw Unit.
4. Dismount the Carriage Motor.

Note : When assembling the Belt, use care so that it may not be contaminated by grease.



● Removing the Pickup Unit

1. Remove two Screws and a Shaft.
2. Dismount the Pickup Unit.